ENVIRONMENTAL PROTECTION AGENCY **6560-50-P**

40 CFR Part 61

[EPA-HQ-OAR-2008-0218; FRL-9816-2]

RIN 2060-AP26

Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: The Environmental Protection Agency (EPA) is proposing to revise certain portions of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for radon emissions from operating uranium mill tailings. The proposed revisions are based on EPA's determination as to what constitutes generally available control technology or management practices (GACT) for this area source category. We are also proposing to add new definitions to this rule, revise existing definitions and clarify that the rule applies to uranium recovery facilities that extract uranium through the in-situ leach method and the heap leach method.

DATES: Comments must be received on or before **[**INSERT DATE 90 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER**]**.

ADDRESSES: Submit your comments, identified by Docket ID No. EPA-HQ-OAR-2008-0218, by one of the following methods:

- www.regulations.gov: Follow the on-line instructions for submitting comments.
- Email: a-and-r-docket@epa.gov
- Fax: 202-566-9744
- Mail: Air and Radiation Docket, Environmental Protection Agency, Mailcode: 2822T, 1200 Pennsylvania Ave., NW, Washington, DC 20460.
- Hand Delivery: EPA West Building, Room 3334, 1301 Constitution Ave., NW Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA-HQ-OAR-2008-0218. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at www.regulations.gov, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through www.regulations.gov or e-mail. The www.regulations.gov website is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through www.regulations.gov your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at http://www.epa.gov/epahome/dockets.htm.

Docket: All documents in the docket are listed in the www.regulations.gov index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in www.regulations.gov or in hard copy at the Office of Air and Radiation Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air and Radiation Docket is (202) 566-1792.

FOR FURTHER INFORMATION CONTACT: Reid J. Rosnick, Office of Radiation and Indoor Air, Radiation Protection Division, Mailcode 6608J, U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW Washington, DC 20460; telephone number: 202-343-9290; fax number: 202-343-2304; email address: rosnick.reid@epa.gov.

SUPPLEMENTARY INFORMATION:

Outline. The information in this preamble is organized as follows:

G. Executive Order 13045: Protection of Children from Environmental Health and Safety Risks
H. Executive Order 13211: Actions Concerning Regulations
That Significantly Affect Energy Supply, Distribution or Use
I. National Technology Transfer Advancement Act
J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

I. General Information

A. Does this Action Apply to Me?

The regulated categories and entities potentially affected by the proposed standards include:

Category	NAICS code[1]	Examples of regulated Entities
Industry:		
Uranium Ores Mining and/or Beneficiating	212291	Area source facilities that extract or concentrate uranium from any ore processed primarily for its source material content
Leaching of Uranium, Radium or Vanadium Ores	212291	Area source facilities that extract or concentrate uranium from any ore processed primarily for its source material content

[1] North American Industry Classification System.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this proposed action. If you have any questions regarding the applicability of this action to a particular entity, consult either the air permit authority for the entity or your EPA regional representative as listed in 40 CFR 61.04 of subpart A (General Provisions).

B. What should I consider as I prepare my comments for EPA?

1. ***Submitting CBI.*** Do not submit this information to EPA through www.regulations.gov or e-mail. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD ROM that you mail to EPA, mark the outside of the disk or CD ROM as CBI and then identify electronically within the disk or CD ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information marked as CBI will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

2. ***Tips for Preparing Your Comments.*** When submitting comments, remember to:

- Identify the rulemaking by docket number and other identifying information (subject heading, Federal Register date and page number).
- Follow directions - The agency may ask you to respond to specific questions or organize

comments by referencing a Code of Federal Regulations (CFR) part or section number.

- Explain why you agree or disagree, suggest alternatives, and substitute language for your requested changes.
- Describe any assumptions and provide any technical information and/or data that you used.
- If you estimate potential costs or burdens, explain how you arrived at your estimate in sufficient detail to allow for it to be reproduced.
- Provide specific examples to illustrate your concerns, and suggest alternatives.
- Explain your views as clearly as possible, avoiding the use of profanity or personal threats.

Make sure to submit your comments by the comment period deadline identified.

C. Acronyms and Abbreviations

We use many acronyms and abbreviations in this document. These include:

AEA – Atomic Energy Act
ALARA – As low as reasonably achievable
BID – Background information document
CAA – Clean Air Act
CAAA – Clean Air Act Amendments of 1990

CCAT – Colorado Citizens Against Toxic Waste
CFR – Code of Federal Regulations
Ci – Curie, a unit of radioactivity equal to the amount of a radioactive isotope that decays at the rate of 3.7×10^{10} disintegrations per second.
DOE – U.S. Department of Energy
EIA – economic impact analysis
EO – Executive Order
EPA – U.S. Environmental Protection Agency
FR – Federal Register
GACT – Generally Available Control Technology
gpm - Gallons Per Minute
HAP – Hazardous Air Pollutant
ICRP – International Commission on Radiological Protection
ISL – In-situ leach uranium recovery, also known as in-situ recovery (ISR)
LCF – Latent Cancer Fatality – Death resulting from cancer that became active after a latent period following exposure to radiation
NAAQS – National Ambient Air Quality Standards
NCRP – National Council on Radiation Protection and Measurements
mrem – millirem, 1×10^{-3} rem
MACT – Maximum Achievable Control Technology
NESHAP – National Emission Standard for Hazardous Air Pollutants
NRC – U.S. Nuclear Regulatory Commission
OMB – Office of Management and Budget
pCi – picocurie, 1×10^{-12} curie
Ra-226 - Radium-226
Rn-222 – Radon-222
Radon flux - A term applied to the amount of radon crossing a unit area per unit time, as in picocuries per square centimeter per second ($pCi/m^2/sec$).
RCRA – Resource Conservation and Recovery Act
Subpart W – National Emission Standards for Radon Emissions from Operating Mill Tailings at 40 CFR 61.250-61.256
TEDE – Total Effective Dose Equivalent
UMTRCA – Uranium Mill Tailings Radiation Control Act of 1978
U.S.C. – United States Code

D. Where can I get a copy of this document?

In addition to being available in the docket, an electronic copy of this proposed action will also be available on the Worldwide Web (WWW) through the Technology Transfer Network (TTN). Following signature, a copy of this proposed action will be posted on the TTN's policy and guidance page for newly proposed or promulgated rules at the following address: http://www.epa.gov/ttn/oarpg/. The TTN provides information and technology exchange in various areas of air pollution control.

E. When would a public hearing occur?

If anyone contacts EPA requesting to speak at a public hearing concerning this proposed rule by [INSERT DATE 60 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER], we will hold a public hearing. If you are interested in attending the public hearing, contact Mr. Anthony Nesky at (202) 343-9597 to verify that a hearing will be held and if you wish to speak. If a public hearing is held, we will announce the date, time and venue on our website at http://www.epa.gov/radiation.

II. Background Information for Proposed Area Source Standards

A. What is the statutory authority for the proposed standards?

Section 112(q)(1) of the Clean Air Act (CAA) requires that National Emission Standards for Hazardous Air Pollutants (NESHAP) "in effect before the date of enactment of the Clean Air Act Amendments of 1990 [Nov. 15, 1990]. . . shall be reviewed and, if appropriate, revised, to comply with the requirements of subsection (d) of . . . section [112].” EPA promulgated 40 CFR part 61, Subpart W, “National Emission Standards for Radon Emissions From Operating Mill Tailings,” (“Subpart W”) on December 15, 1989.[1] EPA is conducting this review of Subpart W under CAA section 112(q)(1) to determine what revisions, if any, are appropriate.

Section 112(d) of the CAA requires EPA to establish emission standards for major and area source categories that are listed for regulation under CAA section 112(c). A major source is any stationary source that emits or has the potential to emit 10 tons per year (tpy) or more of any single hazardous air pollutant (HAP) or 25 tpy or more of any combination of HAP. An area source is a stationary source of HAP that is not a major source. For the purposes of Subpart W, the HAP at issue is radon-222 (hereafter referred to as "radon"). We presently have no data or information that shows any other HAPs being emitted from

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[1] On April 26, 2007, Colorado Citizens Against Toxic Waste and Rocky Mountain Clean Air Action filed a lawsuit against EPA (EPA-HQ-OAR-2008-0218-0013) for EPA’s alleged failure to review and, if appropriate, revise NESHAP Subpart W under CAA section 112(q)(1). A settlement agreement was entered into between the parties in November 2009(EPA-HQ-OAR-2008-0218-0019).

these impoundments. Calculations of radon emissions from operating uranium recovery facilities have shown that facilities regulated under Subpart W are area sources (EPA-HQ-OAR-2008-0218-0001, 0002).

Section 112(q)(1) does not dictate how EPA must conduct its review of those NESHAPs issued prior to 1990. Rather, it provides that the Agency must review, and if appropriate, revise the standards to comply with the requirements of section 112(d). Determining what revisions, if any, are appropriate for these NESHAPs is best assessed through a case-by-case consideration of each NESHAP. As explained below, in this case, we have reviewed Subpart W and are revising the standards consistent with section 112(d)(5), which provides EPA authority to issue standards for area sources.

Under CAA section 112(d)(5), the Administrator may elect to promulgate standards or requirements for area sources "which provide for the use of generally available control technologies or management practices by such sources to reduce emissions of hazardous air pollutants." Under section 112(d)(5), the Administrator has the discretion to use generally available control technology or management practices (GACT) in lieu of maximum achievable control technology (MACT) under section 112(d)(2) and (d)(3), which is required for major sources. Pursuant to section 112(d)(5), we are proposing revisions to Subpart W to reflect GACT.

B. What criteria did EPA use in developing the proposed GACT standards for these area sources?

Additional information on generally available control technologies or management practices (GACT) is found in the Senate report on the legislation (Senate Report Number 101-228, December 20, 1989), which describes GACT as:

> * * * methods, practices and techniques which are commercially available and appropriate for application by the sources in the category considering economic impacts and the technical capabilities of the firms to operate and maintain the emissions control systems.

Consistent with the legislative history, we can consider costs and economic impacts in determining GACT, which is particularly important when developing regulations for source categories, like this one, that may include small businesses.

Determining what constitutes GACT involves considering the control technologies and management practices that are generally available to the area sources in the source category. We also consider the standards applicable to major sources[2] in the same industrial sector to determine if the control technologies and management practices are transferable and generally available to area sources. In appropriate circumstances, we may also consider technologies and practices at area and major sources in similar categories to determine whether such technologies and practices could be considered generally available for the area source category at issue. Finally, as noted above, in determining GACT for a particular area source category, we consider the costs and economic impacts of available control technologies and management practices on that category.

C. What source category is affected by the proposed standards?

As defined by EPA pursuant to the CAA, the source category for Subpart W is "facilities licensed [by the U.S. Nuclear Regulatory Commission (NRC)] to manage uranium byproduct material during and following the processing of uranium ores, commonly referred to as uranium mills and their associated tailings." 40 CFR 61.250. Subpart W defines "uranium byproduct material or tailings" as "the waste produced by the extraction or concentration of

[2] None of the sources in this source category are major sources.

uranium from any ore processed primarily for its source material content.[3]” 40 CFR 61.251(g). For clarity, in this proposed rule we refer to this source category by the term “uranium recovery facilities” and we are proposing to add this phrase to the definitions section of the rule. Use of this term encompasses the existing universe of facilities whose HAP emissions are currently regulated under Subpart W. Uranium recovery facilities process uranium ore to extract uranium. The HAP emissions from any type of uranium recovery facility that manages uranium byproduct material or tailings is subject to regulation under Subpart W. This currently includes three types of uranium recovery facilities: (1) conventional uranium mills; (2) in-situ leach recovery facilities; and (3) heap leach facilities. Subpart W requirements specifically apply to the affected sources at the uranium recovery facilities that are used to manage or contain the uranium byproduct material or

[3] Pursuant to the Atomic Energy Act of 1954, as amended, the Nuclear Regulatory Commission defines “source material” as “(1) Uranium or thorium or any combination of uranium or thorium in any chemical or physical form; or (2) Ores that contain, by weight, one-twentieth of one percent (0.05 percent), or more, of uranium or thorium, or any combination of uranium or thorium.” (10 CFR 20.1003) For a uranium recovery facility licensed by the Nuclear Regulatory Commission under 10 CFR Part 40, “byproduct material” means the “tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes.” (10 CFR 20.1003 and 40.4)

tailings. Common names for these structures may include, but are not limited to, impoundments, tailings impoundments, evaporation or holding ponds, and heap leach piles. However, the name itself is not important for determining whether Subpart W requirements apply to that structure; rather, applicability is based on the use of these structures to manage or contain uranium byproduct material.

D. What are the production operations, emission sources, and available controls?

As noted above, uranium recovery and processing currently occurs by one of three methods: (1) conventional milling; (2) in-situ leach (ISL); and (3) heap leach. Below we present a brief explanation of the various uranium recovery methods and the usual structures that contain uranium byproduct materials.

(1) Conventional Mills.

Conventional milling is one of the two primary recovery methods that are currently used to extract uranium from uranium-bearing ore. Conventional mills are typically located in areas of low population density. Only one conventional mill in the United States is currently operating; all others are in standby, in decommissioning (closure) or have been decommissioned.

A conventional uranium mill is a chemical plant that extracts uranium using the following process:

(A) Trucks deliver uranium ore to the mill, where it is crushed before the uranium is extracted through a leaching process. In most cases, sulfuric acid is the leaching agent, but alkaline solutions can also be used to leach the uranium from the ore. The process generally extracts 90 to 95 percent of the uranium from the ore.

(B) The mill then concentrates the extracted uranium to produce a uranium oxide material which is called "yellowcake" because of its yellowish color.[4]

(C) Finally, the yellowcake is transported to a uranium conversion facility where it is processed through the stages of the nuclear fuel cycle to produce fuel for use in nuclear power reactors.

(D) The extraction process in (A) and (B) above produces both solid and liquid wastes (i.e., uranium byproduct material, or "tailings") which are transported from the extraction location to an on-site tailings impoundment or a pond for temporary storage.

Uranium byproduct material/tailings are typically created in slurry form during the crushing, leaching and

[4] The term "yellowcake" is still commonly used to refer to this material, although in addition to yellow the uranium oxide material can also be black or grey in color.

concentration processes and are then deposited in an impoundment or "mill tailings pile" which must be carefully monitored and controlled. This is because the mill tailings contain heavy metal ore constituents, including radium. The radium decays to produce radon, which may then be released to the environment. Because radon is a radioactive gas which may be inhaled into the respiratory tract, EPA has determined that exposure to radon and its daughter products contributes to an increased risk of lung cancer. [5]

The holding or evaporation ponds at this type of facility hold liquids containing byproduct material from which HAP emissions are also regulated under Subpart W. These ponds are discussed in more detail in the next section.

(2) In-Situ Leach/Recovery

In-situ leach or recovery sites (ISL/ISR, in this document we will use ISL) represent the majority of the uranium recovery operations that currently exist. The research and development projects and associated pilot projects of the 1980s demonstrated ISL as a viable uranium recovery technique where site conditions (e.g., geology) are amenable to its use. Economically, this technology

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[5] http://www.epa.gov/radon/risk_assessment.html.

produces a better return on the investment dollar (EPA-HQ-OAR-2008-0218-0087); therefore, the cost to produce uranium is more favorable to investors. Due to this, the trend in uranium production has been toward the ISL process.

In-situ leaching is defined as the underground leaching or recovery of uranium from the host rock (typically sandstone) by chemicals, followed by recovery of uranium at the surface. Leaching, or more correctly the re-mobilization of uranium into solution, is accomplished through the underground injection of a lixiviant (described below) into the host rock (i.e., ore body) through wells that are connected to the ore formation. A lixiviant is a chemical solution used to extract (or leach) uranium from underground ore bodies.

The injection of a lixiviant essentially reverses the geochemical reactions that resulted in the formation of the uranium deposit. The lixiviant assures that the dissolved uranium, as well as other metals, remains in the solution while it is collected from the ore zone by recovery wells, which pump the solution to the surface. At the surface, the uranium is recovered in an ion-exchange column and further processed into yellowcake. The yellowcake is packaged and transported to a uranium conversion facility where it is processed through the stages of the nuclear fuel cycle to produce fuel for use in nuclear power reactors.

Two types of lixiviant solutions can be used, loosely defined as “acid” or “alkaline” systems. In the U.S., the geology and geochemistry of the majority of the uranium ore bodies favors the use of alkaline lixiviants such as bicarbonate-carbonate lixiviant and oxygen. Other factors in the choice of the lixiviant are the uranium recovery efficiencies, operating costs, and the ability to achieve satisfactory ground-water restoration.

After processing, lixiviant is recharged (more carbonate/bicarbonate or dissolved carbon dioxide is added to the solution) and pumped back down into the formation for reuse in extracting more uranium. However, a small amount of this liquid is held back from reinjection to maintain a proper hydraulic gradient[6] within the wellfield. The amount of liquid held back is a function of the characteristics of the formation properties (e.g., permeability, hydraulic conductivity, transmissivity). This excess liquid is sent to an impoundment (often called an evaporation pond or holding pond) on site or injected into a deep well for disposal. These impoundments, since they

[6] The hydraulic gradient determines which direction water in the formation will flow, which in this case limits the amount of water that migrates away from the ore zone.

contain uranium byproduct material, are subject to the requirements of Subpart W.[7] With respect to the lixiviant reinjected into the wellfield, there is a possibility of the lixiviant spreading beyond the zone of the uranium deposit (excursion), and this produces a threat of ground-water contamination. The operator of the ISL facility remediates any excursion by pumping large amounts of water in or out of the formation (at various wells) to contain the excursion, and this water (often containing byproduct material either before or after injection into or withdrawal from the formation) is often stored in the evaporation or holding ponds.[8] Although the excursion control operation itself is not regulated under Subpart W, the ponds that contain byproduct material are regulated under that subpart, since they are a potential source of radon emissions. After the ore body has been depleted, restoration of the formation (attempting to return the formation back to its original geochemical and geophysical properties) is accomplished by flushing the host rock with water and sometimes additional chemicals. Since small amounts of uranium are still contained in the returning

[7] As described later in this preamble, the design requirements for these impoundments are derived from the RCRA requirements for impoundments.
[8] By controlling the hydraulic gradient of the formation the operator controls the direction of flow of water, containing the water within specified limits of the formation.

water, the restoration fluids are also considered byproduct material, and are usually sent to evaporation ponds for disposition.

(3) Heap Leaching

In addition to conventional uranium milling and ISL, some facilities may use an extraction method known as heap leaching. In some instances uranium ore is of such low grade, or the geology of the ore body is such that it is not cost-effective to remove the uranium via conventional milling or through ISL.[9] In this case a heap leaching method may be utilized.

No such facilities currently operate to recover uranium in the U.S. However, there are plans for at least one facility to open in the U.S. within the next few years. Heap leach operations involve the following process:

A. Small pieces of ore are placed in a large pile, or "heap," on an impervious geosynthetic liner with perforated pipes under the heap. For the purposes of Subpart W the impervious pad will meet the requirements for design and construction of impoundments found at 40 CFR 192.32 (a).

[9] The ore grade is so low that it is not practical to invest large sums of capital to extract the uranium. Heap leach is a much more passive and relatively inexpensive system.

B. An acidic solution is then sprayed[10] over the ore to dissolve the uranium it contains.

C. The uranium-rich solution drains into the perforated pipes, where it is collected and transferred to an ion-exchange system.

D. The heap is "rested," meaning that there is a temporary cessation of application of acidic solution to allow for oxidation of the ore before leaching begins again.

E. The ion-exchange system extracts the uranium from solution where it is later processed into a yellowcake.[11]

F. Once the uranium has been extracted, the remaining solution still contains small amounts of uranium byproduct material (the extraction process is not 100% effective), and this solution is either piped to the heap leach pile to be reused or piped to an evaporation or holding pond. In the evaporation pond it is subject to the Subpart W requirements.

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[10] Other technology includes drip systems, sometimes used at gold extraction heaps, and flooding of the heap leach pile.

[11] It is our understanding that either ion-exchange or solvent extraction techniques can be used to recover uranium at heap leach facilities. The decision to use one type or the other depends largely on the quality of the ore at a particular site.

G. The yellowcake is transported to a uranium conversion facility where it is processed through the stages of the nuclear fuel cycle to produce fuel for use in nuclear power reactors.

H. Finally, there is a final drain down of the heap solutions, as well as a possible rinsing of the heap. These solutions will contain byproduct material and will be piped to evaporation or holding ponds, where they become subject to the Subpart W requirements. The heap leach pile will be closed in place according to the requirements of 40 CFR 192.32.

Today we are proposing to regulate the HAP emissions from heap leach uranium extraction under Subpart W, in addition to conventional impoundments and evaporation ponds, which are already regulated under this Subpart. Our rationale (explained in greater detail in Section IV.D.4.) is that from the moment uranium extraction takes place in the heap, uranium byproduct material is left behind. Therefore the byproduct material must be managed with the same design as a conventional impoundment, with a liner and leak detection system prescribed at 40 CFR 192.32(a), and an effective method of limiting radon emissions while the heap leach pile is being used to extract uranium.

As described above, there may also be holding or evaporation ponds at this type of facility. In many cases these ponds hold liquids containing byproduct material. The byproduct material is contained in the liquids used to leach uranium from the ore in the heap leach pile as well as draining the heap leach pile in preparation for closure. The HAP emissions from these fluids are currently regulated under Subpart W.

E. What are the existing requirements under Subpart W?

Subpart W was promulgated on December 15, 1989 (54 FR 51654). At the time of promulgation the predominant form of uranium recovery was through the use of conventional mills. There are two separate standards required in Subpart W. The first standard is for "existing" impoundments, e.g., those in existence and licensed by the NRC (or it's Agreement States) on or prior to December 15, 1989. Owners or operators of existing tailings impoundments must ensure that emissions from those impoundments do not exceed a radon (Rn-222) flux standard of 20 picocuries per meter squared per second (pCi/m^2/sec). As stated at the time of promulgation: "This rule will have the practical effect of requiring the mill owners to keep their piles wet or covered.[12]" Keeping the piles (impoundments) wet or covered with soil would reduce radon emissions to a level that would meet the standard. This is still considered an effective method to reduce radon emissions at all uranium tailings impoundments.

The method for monitoring for compliance with the radon flux standard was prescribed as Method 115, found at 40 CFR part 61, Appendix B. The owners or operators of existing impoundments must report to EPA the results of the compliance testing for any calendar year by no later than March 31 of the following year.

There is currently one existing operating mill with impoundments that pre-date December 15, 1989, and two mills that are currently in standby mode.

The second standard applies to "new" impoundments designed and/or constructed after December 15, 1989. The requirements applicable to new impoundments are work practice standards that regulate either the size and number of impoundments, or the amount of tailings that may remain uncovered at any time. 40 CFR 61.252(b) states that no new tailings impoundment can be built after December 15, 1989,

[12] See 54 FR 51689.

unless it is designed, constructed and operated to meet one of the following two work practices:

1. Phased disposal in lined impoundments that are no more than 40 acres in area, and meet the requirements of 40 CFR 192.32(a) as determined by the NRC. The owner or operator shall have no more than two impoundments, including existing impoundments, in operation at any one time.
2. Continuous disposal of tailings that are dewatered and immediately disposed with no more than 10 acres uncovered at any time, and operated in accordance with 40 CFR 192.32(a) as determined by the NRC.

The basis of the work practice standards is to (1) limit the size of the impoundment, which limits the radon source; or (2) utilize the continuous disposal system, which prohibits large accumulations of uncovered tailings, limiting the amount of radon released.

The work practice standards described above were promulgated after EPA considered a number of factors that influence the emissions of Rn-222 from tailings impoundments, including the climate and the size of the impoundment. For example, for a given concentration of Ra-226 in the tailings, and a given grain size of the tailings, the moisture content of the tailings will control the radon emission rate; the higher the moisture content the lower the emission rate. In the arid and semi-arid areas of the country where most impoundments are located or proposed, the annual evaporation rate is quite high. As a result, the exposed tailings (absent controls like sprinkling) dry rapidly. In previous assessments, we explicitly took the fact of rapid drying into account by using a Rn-222 flux rate of 1 pCi/m^2/s per pCi/g Ra-226 to estimate the Rn-222 source term from the dry areas of the impoundments. (Note: The estimated source terms from the ponded (areas completely covered by liquid) and saturated areas of the impoundments are considered to be zero, reflecting the complete attenuation of the Rn-222).

Another factor we considered was the area of the impoundment, which has a direct linear relationship with the Rn-222 source term, more so than the depth or volume of the impoundment. Again, assuming the same Ra-226 concentration and grain sizes in the tailings, a 100-acre dry impoundment will emit 10 times the radon of a 10-acre dry impoundment. This linear relationship between size and Rn-222 source term is one of the main reasons that Subpart W imposed size restrictions on all future impoundments (40 acres per impoundment if phased disposal is chosen and 10 acres total uncovered if continuous disposal is chosen).

Subpart W also mandates that all tailings impoundments at uranium recovery facilities comply with the requirements at 40 CFR 192.32(a). EPA explained the reason for adding this requirement in the preamble as follows:

> "EPA recognizes that in the case of a tailings pile which is not synthetically or clay lined (the clay lining can be the result of natural conditions at the site) water placed on the tailings in an amount necessary to reduce radon levels, can result in ground water contamination. In addition, in certain situations the water can run off and contaminate surface water. EPA cannot allow a situation where the reduction of radon emissions comes at the expense of increased pollution of the ground or surface water. Therefore, all piles will be required to meet the requirements of 40 CFR 192.32(a) which protects water supplies from contamination. Under the current rules, existing piles are exempt from these provisions, this rule will end that exemption."

54 FR 51654, 51680 (December 15, 1989). Therefore, all impoundments are required to meet the requirements at 40 CFR 192.32(a).

Section 192.32(a) includes a cross-reference to the surface impoundment design and construction requirements of hazardous waste surface impoundments regulated under the Resource Conservation and Recovery Act (RCRA), found at 40 CFR 264.221. Those requirements state that the impoundment shall be designed, constructed and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil or ground water or surface water at any time during the active life of the impoundment. Briefly, 40 CFR 264.221(c) requires that the liner system must include:

1. A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into the liner during the active life of the unit.
2. A composite bottom liner consisting of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life of the unit. The lower component must be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component must be constructed of at least three feet of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/sec.
3. A leachate collection and removal system between the liners, which acts as a leak detection system. This system must be capable of detecting, collecting and removing hazardous constituents at the earliest practicable time through all areas of the top liner

likely to be exposed to the waste or liquids in the impoundment.

There are other requirements for the design and operation of the impoundment, and these include construction specifications, slope requirements, sump and liquid removal requirements.[13]

F. How did we gather information for this proposed rule?

This section describes the information we used as the basis for making the determination to revise Subpart W. We collected this information using various methods. We performed literature searches, where appropriate, of the engineering methods used by existing uranium recovery facilities in the United States as well as the rest of the world. We used this information to determine whether the technology used to contain uranium byproduct material had advanced since the time of the original promulgation of Subpart W. We reviewed and compiled a list of existing and proposed uranium recovery facilities and the containment technologies being used, as well as those proposed to be used. We compared and contrasted those technologies with the engineering requirements of hazardous waste surface impoundments regulated under Subtitle C of the Resource

[13] For detailed information on the design and operating requirements, refer to 40 CFR Part 264 Subpart K – Surface Impoundments.

Conservation and Recovery Act (RCRA), which are used as the design basis for existing uranium byproduct material impoundments.

We collected information on existing uranium mills and in-situ leach facilities by issuing information collection requests authorized under section 114(a) of the CAA to seven uranium recovery facilities. At the time, this represented 100% of existing facilities. Since then, Cotter Corp. has closed its Cañon City facility. These requests required uranium recovery companies to provide detailed information about the uranium mill and/or in-situ leaching facility, as well as the number, sizes and types of affected sources (tailings impoundments, evaporation ponds and collection ponds) that now or in the past held uranium byproduct material. We requested information on the history of operation since 1975, ownership changes, whether the operation was in standby mode and whether plans existed for new facilities or reactivated operations were expected.[14] We also reviewed the regulatory history of Subpart W and the radon measurement methods used to determine compliance with the existing standards. Below is a synopsis of the information we collected and our analyses.

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[14] Section 114(a) letters and responses can be found at http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html.

1. Pre-1989 Conventional Mill Impoundments

We have been able to identify three facilities, either operating or on standby,[15] that have been in operation since before the promulgation of Subpart W in 1989. These existing facilities must ensure that emissions from their operational, pre-1989 impoundments[16] not exceed a radon (Rn-222) flux standard of 20 pCi/m^2/sec. The method for monitoring for compliance with the radon flux standard was prescribed as Method 115, found at 40 CFR part 61, Appendix B. These facilities must also meet the requirements in 40 CFR 61.252(c), which cross-references the requirements of 40 CFR 192.32(a).

The White Mesa Conventional Mill in Blanding, Utah, has one pre-1989 impoundment (known by the company as Cell 3) that is currently in operation and near capacity but is still authorized and continues to receive tailings. The company is now pumping any residual free solution out of the cell and contouring the sands. It will then be determined whether any more solids need to be added to the

[15] "Standby" is when a facility impoundment is licensed for the continued placement of tailings/byproduct material but is currently not receiving tailings/byproduct material. See Section V.A. for a discussion of this definition that we are proposing to add to Subpart W.

[16] In this preamble when we use the generic term "impoundment," we are using the term as described by industry.

cell to fill it to the specified final elevation. It is expected to close in the near future (EPA-HQ-OAR-2008-0218-0069). The mill also uses an impoundment constructed before 1989 as an evaporation pond (known as Cell 1). To the extent this evaporation pond contains byproduct material, its HAP emissions are also regulated by Subpart W.

The Sweetwater conventional mill is located 42 miles northwest of Rawlins, Wyoming. The mill operated for a short time in the 1980s and is currently in standby status. Annual radon values collected by the facility indicate that there is little measurable radon flux from the mill tailings that are currently in the lined impoundment. This monitoring program remains active at the facility. According to company records, of the 37 acres of tailings, approximately 28.3 acres of tailings are covered with soil; the remainder of the tailings are continuously covered with water. The dry tailings have an earthen cover that is maintained as needed. During each monitoring event one hundred radon flux measurements are taken on the tailings continuously covered by soil, as required by Method 115 for compliance with Subpart W. The mean radon flux for the exposed tailings over the past 21 years was 3.5 pCi/m^2/sec. The radon flux for the entire tailings impoundment was calculated to be 6.01 pCi/m^2/sec. The calculated radon flux from the entire tailings impoundment surface is thus approximately 30% of the 20.0 pCi/m^2/sec standard (EPA-HQ-OAR-2008-0218-0087).

The Shootaring Canyon project is a conventional mill located about 3 miles north of Ticaboo, Utah, in Garfield County. The approximately 1,900-acre site includes an ore pad, a small milling building, and a tailings impoundment system that is partially constructed. The mill operated for a very short period of time. Shootaring Canyon did pre-date the standard, but the mill was shut down prior to the promulgation of the standard. The impoundment is in a standby status and has an active license administered by the Utah Department of Environmental Quality, Division of Radiation Control. The future plans for this uranium recovery operation are unknown. Current activities at this remote site consist of intermittent environmental monitoring by consultants to the parent company (EPA-HQ-OAR-2008-0218-0087).

The Shootaring Canyon mill operated for approximately 30 days. Tailings were deposited in a portion of the upper impoundment. A lower impoundment was conceptually designed but has not been built. Milling operations in 1982 produced 25,000 cubic yards of tailings, deposited in a 2,508 m^2 (0.62 acres) area. The tailings are dry except for moisture associated with occasional precipitation events; consequently, there are no beaches[17]. The tailings have a soil cover that is maintained by the operating company. Radon sampling for the 2010 year took place in April. Again, one hundred radon flux measurements were collected. The average radon flux from this sampling event was 11.9 pCi/m^2-sec.

A fourth mill is Cotter Corporation in Cañon City, Colorado. The mill no longer exists, and the pre-1989 impoundments are in closure.

2. 1989-Present Conventional Mill Impoundments

There currently is only one operating conventional mill with an impoundment that was constructed after December 15, 1989. The White Mesa conventional mill in Utah has two impoundments (Cell 4A and Cell 4B: Cell 4A is currently operating as a conventional impoundment and Cell 4B is being used as an evaporation pond) designed and constructed after 1989. The facility uses the phased disposal work practice.

There are several conventional mills in the planning and/or permitting stage and conventional impoundments at

[17] The term "beaches" refers to portions of the tailings impoundment where the tailings are wet but not saturated or covered with liquids.

these mills will be required to utilize one of the current work practice standards.

3. In-Situ Leach Facilities

After 1989 the price of uranium began to fall, and the uranium mining and milling industry essentially collapsed, with very few operations remaining in business. However, several years ago the price of uranium began to rise so that it became profitable once more for companies to consider uranium recovery. ISL has become the preferred choice for uranium extraction where suitable geologic conditions exist.

Currently there are five ISL facilities in operation: (1) the Alta Mesa project in Brooks County, Texas; (2) the Crow Butte Operation in Dawes County, Nebraska; (3) the Hobson/La Palangana Operation in South Texas; (4) the Willow Creek (formerly Christensen Ranch/Irigaray Ranch) Operation in Wyoming; and (5) the Smith Ranch-Highland Operation in Converse County, Wyoming.[18] These facilities use or have used evaporation ponds to hold back liquids containing uranium byproduct material from reinjection to maintain a proper hydraulic gradient within the wellfield.[19]

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[18] Source: U.S. Energy Information Administration, http://www.eia.gov/uranium/production/quarterly/html/qupd_tbl4.html.

[19] The Alta Mesa operation uses deep well injection rather than evaporation ponds.

These ponds are subject to the Subpart W requirements and range in size from less than an acre to up to 40 acres. Based on the information provided to us the ponds meet the requirements of 40 CFR 61.252(c).

There are approximately 11 additional ISL facilities in various stages of licensing or on standby. It is anticipated that there could be approximately another 20-30 license applications over the next 5-10 years.[20]

4. Heap Leach Facilities

As stated earlier, there are currently no operating heap leach facilities in the United States. We are aware of two or three potential future operations. The project most advanced in the application process is the Sheep Mountain facility in Wyoming. Energy Fuels has announced its intent to submit a license application to the NRC in March 2014. One or two other as yet to be determined operations may be located in Lander County, Nevada and/or a site in New Mexico.[21]

[20] Source: http://www.nrc.gov/materials/uranium-recovery/license-apps/ur-projects-list-public.pdf.

[21] http://www.nrc.gov/materials/uranium-recovery/license-apps/ur-projects-list-public.pdf.

5. Flux Requirement versus Management Practices for Conventional Impoundments in operation before December 15, 1989.

In performing our analysis we considered the information we received from all the existing conventional impoundments. We also looked at the compliance history of the existing conventional impoundments. After this review we considered two specific questions: 1) Are any of the conventional impoundments using any novel methods to reduce radon emissions? 2) Is there now any reason to believe that any of the existing conventional impoundments could not comply with the management practices for new conventional impoundments, in which case would we need to continue to make the distinction between conventional impoundments constructed before or after December 15, 1989? We arrived at the following conclusions: First, we are not aware of any conventional impoundment that uses any new or different technologies to reduce radon emissions. Conventional impoundment operators continue to use the standard method of reducing radon emissions by limiting the size of the impoundment and covering tailings with soil or keeping tailings wet. These are very effective methods for limiting the amount of radon released to the environment.

Second, we believe that only one existing operating conventional impoundment designed and in operation before December 15, 1989, could not meet the work practice standards. This impoundment is Cell 3 at the White Mesa mill, which is expected to close in 2014 (Personal communication between EPA staff and Utah Department of Environmental Quality staff, May 16, 2013, EPA-HQ-2008-0218-0081). We were very clear in our 1989 rulemaking that all conventional mill impoundments must meet the requirements of 40 CFR 192.32(a), which, in addition to requiring ground-water monitoring, also required the use of liner systems to ensure there would be no leakage from the impoundment into the ground water. We did this by removing the exemption for existing piles from the 40 CFR 192.32(a) requirements (54 FR 51680). However, we did not require those existing impoundments to meet either the phased disposal or continuous disposal work practice standards, which limit the exposed area and/or number of conventional impoundments, thereby limiting the potential for radon emissions. This is because at the time of promulgation of the rule, conventional impoundments existed that were larger in area than the maximum work practice standard of 40 acres used for the phased disposal work practice, or 10 acres for the continuous disposal requirement. This area limitation was important in reducing the amount of exposed tailings that were available to emit radon. However, we recognized that by instituting a radon flux standard we would require owners and operators to limit radon emissions from these preexisting impoundments (usually by placing water or soil on exposed portions of the impoundments). The presumption was that conventional impoundments constructed before this date could otherwise be left in a dry and uncovered state, which would allow for unfettered release of radon. The flux standard was promulgated to have the practical effect of requiring owners and operators of these old impoundments to keep their tailings either wet or covered with soil, thereby reducing the amount of radon that could be emitted (54 FR 51680).

We believe that the existing conventional impoundments at both the Shootaring Canyon and Sweetwater facilities can meet the work practice standards in the current Subpart W regulation. The conventional impoundments at both these facilities are less than 40 acres in area and are synthetically lined as per the requirements in 40 CFR 192.32(a). We also have information that the new conventional impoundments operating at the White Mesa mill will utilize the phased work practice standard of limiting conventional impoundments to no more than two, each 40 acres or less in area. We also have information that Cell 3 at the White Mesa facility will be closed in 2014, and the phased disposal work method will be used for the remaining cells. (Personal communication between EPA staff and staff of Utah Department of Environmental Quality, May 16, 2013 (EPA-HQ-2008-0218-0081). As a result, we find there would be no conventional impoundment designed or constructed before December 15, 1989 that could not meet a work practice standard. Since the conventional impoundments in existence prior to December 15, 1989 appear to meet the work practice standards, we are proposing to eliminate the distinction of whether the conventional impoundment was constructed before or after December 15, 1989. We are also proposing that all conventional impoundments (including those in existence prior to December 15, 1989) must meet the requirements of one of the two work practice standards, and that the flux standard of 20 pCi/m^2/sec will no longer be required for the impoundments in existence prior to December 15, 1989.

G. How does this action relate to other EPA standards?

Under the CAA, EPA promulgated Subpart W, which includes standards and other requirements for controlling radon emissions from operating mill tailings at uranium recovery facilities. Under our authority in the Uranium Mill

Tailings Radiation Control Act of 1978 (UMTRCA), we have also issued standards that are more broadly applicable to uranium and thorium byproduct materials at active and inactive uranium recovery facilities. NRC (or Agreement States[22]) and DOE implement and enforce these standards at these uranium recovery facilities as directed by UMTRCA. These standards, located in 40 CFR part 192, address the radiological and non-radiological hazards of uranium and thorium byproduct materials in ground water and soil, in addition to air. For the non-radiological hazards, UMTRCA directed us to promulgate standards consistent with those used by EPA to regulate non-radiological hazardous materials under RCRA. Therefore, our part 192 standards incorporate the ground-water protection requirements applied to hazardous waste management units under RCRA and specify the placement of uranium or thorium byproduct materials in impoundments constructed in accordance with RCRA requirements. Radon emissions from non-operational impoundments (i.e., those with final covers) are limited in

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[22] An Agreement State is a State that has entered into an agreement with the Nuclear Regulatory Commission under section 274 of the Atomic Energy Act of 1954 (42 U.S.C. 2021)and has authority to regulate byproduct materials (as defined in section 11e.(2)of the Atomic Energy Act)and the disposal of low-level radioactive waste under such agreement.

40 CFR part 192 to the emissions levels of 20 pCi/m^2/sec. We are currently preparing a regulatory proposal to update provisions of 40 CFR part 192, with emphasis on ground-water protection for ISL facilities. As explained in previous sections, Subpart W currently contains reference to some of the part 192 standards.

H. Why did we conduct an updated Risk Assessment?

While not required by or conducted as part of our GACT analysis, one of the tasks we performed for our own purposes was to update the risk analysis we performed when we promulgated Subpart W in 1989. We performed a comparison between the 1989 risk assessment and current risk assessment approaches, focusing on the adequacy and the appropriateness of the original assessments. We did this for informational purposes only and not for or as part of our GACT analysis. Instead, we prepared this updated risk assessment because we wanted to demonstrate that even using updated risk analysis procedures (i.e. using procedures updated from those used in the 1980s), the existing radon flux standard appears to be protective of the public health and the environment. We did this by using the information we collected to perform new risk assessments for existing facilities, as well as two idealized "generic" sites, one located in the eastern half of the United States and one located in the southwest United States. (These two model sites do not exist. They are idealized using representative features of mills in differing climate and geography). This information has been collected into one document[23] that has been placed in the docket (EPA-HQ-OAR-2008-0218-0087) for this proposed rulemaking.

As part of this work, we evaluated various computer models that could be used to calculate the doses and risks due to the operation of conventional and ISL uranium recovery facilities, and selected CAP88 V 3.0 for use in this analysis. CAP88 V 3.0 was developed in 1988 from the AIRDOS, RADRISK, and DARTAB computer programs, which had been developed for the EPA at the Oak Ridge National Laboratory (ORNL).

CAP88 V 3.0, which stands for "Clean Air Act Assessment Package-1988 version 3.0," is used to demonstrate compliance with the NESHAP requirements applicable to radionuclides. CAP88 V 3.0 calculates the doses and risk to a designated receptor as well as to the surrounding population. Exposure pathways evaluated by CAP88 V 3.0 are: inhalation, air immersion, ingestion of

[23] Technical and Regulatory Support to Develop a Rulemaking to Potentially Modify the NESHAP Subpart W Standard for Radon Emissions from Operating Uranium Mills (40 CFR 61.250).

vegetables, meat, and milk, and ground surface exposure. CAP88 V 3.0 uses a modified Gaussian plume equation to estimate the average dispersion of radionuclides released from up to six emitting sources. The sources may be either elevated stacks, such as a smokestack, or uniform area sources, such as the surface of a uranium byproduct material impoundment. Plume rise can be calculated assuming either a momentum or buoyant-driven plume.

At several sites analyzed in this evaluation only site-wide releases of radon were available to us. This assessment was limited by the level of detail provided by owners and operators of uranium recovery facilities. In instances where more specific site data were available, site-wide radon releases were used as a bounding estimate. Assessments are done for a circular grid of distances and directions for a radius of up to 80 kilometers (50 miles) around the facility. The Gaussian plume model produces results that agree with experimental data as well as any comparable model, is fairly easy to work with, and is consistent with the random nature of turbulence. A description of CAP88 V 3.0 and the computer models upon which it is based is provided in the CAP88 V 3.0 Users Manual.[24]

The uranium recovery facilities that we analyzed included three existing conventional mills (Cotter, White Mesa and Sweetwater), five operating ISL operations (the Alta Mesa project in Brooks County, Texas; the Crow Butte Operation in Dawes County, Nebraska; the Hobson/La Palangana Operation in South Texas; the Willow Creek (formerly Christensen Ranch/Irigaray Ranch) Operation in Wyoming; and the Smith Ranch-Highland Operation in Converse County, Wyoming), and two generic sites assumed for the location of conventional mills (we chose conventional mills because we believe they have the potential for greater radon emissions). One generic site was modeled in the southwest United States (Western Generic) while the other was assumed to be located in the eastern United States (Eastern Generic).[25] An Eastern generic site was selected for the second generic site to accommodate the recognition that a number of uranium recovery facilities are expected to apply for construction licenses in the future, and to determine potential risks in geographic areas of the U.S. that customarily have not hosted uranium recovery

[24] http://www.epa.gov/radiation/assessment/CAP88 V 3.0/index.html.
[25] There is a potential in the future for uranium recovery in areas like south-central Virginia.

facilities. For this assessment the conventional mills we were most interested in were the White Mesa mill and the Sweetwater mill. (The Shootaring Canyon mill was not analyzed, because the impoundment is very small and is soil covered, and the Cotter facility is now in closure). These conventional mills are either in operation or standby and are subject to the flux standard of 20 pCi/m^2/sec. The risk analyses performed for these two mills showed that the maximum lifetime cancer risks from radon emissions from the White Mesa impoundments were 1.1 x 10^{-4} while the maximum lifetime cancer risks from radon associated with the impoundments at the Sweetwater mill were 2.4 x 10^{-5}. As we indicated in our original 1989 risk assessment, in protecting public health, EPA strives to provide the maximum feasible protection by limiting lifetime cancer risk from radon exposure to approximately 1 in 10,000 (i.e., 10^{-4})[26]. The analyses also estimated that the total cancer risk to the populations surrounding all ten modeled uranium sites (i.e., total cancer fatalities) is between 0.0015 and 0.0026 fatal cancers per year, or approximately 1 case every 385 to 667 years for the 4 million persons living within 80 km of the uranium recovery facilities.

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[26] See 54 FR 51656

Similarly, the total cancer incidence for all ten modeled sites is between 0.0021 and 0.0036 cancers per year, or approximately 1 case every 278 to 476 years. The analyses are described in more detail in the background document generated for this proposal.[27] As stated above, we performed this risk assessment for informational purposes only. The risk assessment was not required or considered during our analysis for proposing GACT standards for uranium recovery facilities (e.g., conventional impoundments, non-conventional impoundments or heap leach piles).

III. Summary of the Proposed Requirements

We are proposing to revise Subpart W to include requirements we have identified that are generally available for controlling radon emissions in a cost-effective manner, and are not currently included in Subpart W. Specifically, we are proposing to require that non-conventional impoundments and heap leach piles must maintain minimum liquid levels to control their radon emissions from these affected sources.

Additionally, we are revising Subpart W to propose GACT standards for the affected sources at conventional

[27] All risks are presented as LCF risks. If it is desired to estimate the morbidity risk, simply multiply the LCF risk by 1.39. For a more detailed analysis of cancer mortality and morbidity, please see the Background Information Document, Docket number EPA-HQ-OAR-0218-0087.

uranium mills, ISL facilities and heap leach facilities. Given the evolution of uranium recovery facilities over the last 20 years, we believe it is appropriate to revise Subpart W to tailor the requirements of the rule to the different types of facilities in existence at this time. We are therefore proposing to revise Subpart W to add appropriate definitions, standards and other requirements that are applicable to HAP emissions at these uranium recovery facilities.

Our experience with ensuring that uranium recovery facilities are in compliance with Subpart W also leads us to propose three more changes. First, we are proposing to remove certain monitoring requirements that we believe are no longer necessary for demonstrating compliance with the proposed GACT standards. Second, we are proposing to revise certain definitions so that owners and operators clearly understand when Subpart W applies to their facility. Third, we are proposing to clarify what specific liner requirements must be met under Subpart W.[28]

[28] Under its CAA authority, EPA requires facilities subject to Subpart W to build impoundments in a manner that complies with the requirements found in 40 CFR 192. As a matter of convenience, EPA cross-references the part 192 requirements in Subpart W instead of copying them directly into Subpart W. This cross-referencing convention is often used in rulemakings.

Taken altogether, the proposed revisions to Subpart W are appropriate for updating, clarifying and strengthening the management of radon emissions from the uranium byproduct material generated at uranium recovery facilities.

A. What are the affected sources?

Today we are proposing to revise Subpart W to include requirements for affected sources at three types of operating uranium recovery facilities: (1) conventional uranium mills; (2) ISL facilities; and (3) heap leach facilities. The affected sources at these uranium recovery facilities include conventional impoundments, non-conventional impoundments where tailings are contained in ponds and covered by liquids (examples of these affected sources are evaporation or holding ponds that may exist at conventional mills, ISL facilities and heap leach facilities), and heap leach piles. The proposed GACT standards and the rationale for these proposed standards are discussed below and in Section IV. We request comment on all aspects of these proposed requirements.

B. What are the proposed requirements?

1. Conventional impoundments.

In the 1989 promulgation of Subpart W we created two work practice standards, phased disposal and continuous disposal, for uranium tailings impoundments designed and constructed after December 15, 1989. The work practice standards, which limit the exposed area and/or number of conventional impoundments at a uranium recovery facility, require that these impoundments be no larger than 40 acres (for phased disposal) or 10 uncovered acres (for continuous disposal). We also limited the number of conventional impoundments operating at any one time to two. We took this approach because we recognized that the radon emissions from very large conventional impoundments could impose unacceptable health effects if the piles were left dry and uncovered. The 1989 promulgation also included the requirements in 40 CFR 192.32(a), which include design and construction requirements for the impoundments as well as requirements for prevention and mitigation of ground-water contamination.

As discussed earlier, we no longer believe that a distinction needs to be made for conventional impoundments based on the date when they were designed and/or constructed. We believe that the existing conventional impoundments at both the Shootaring Canyon and Sweetwater facilities can meet the work practice standards in the current Subpart W regulation. The conventional impoundments at both these facilities are less than 40 acres in area and are synthetically lined as per the requirements in 40 CFR 192.32(a)(1). The existing cell 3 at the White Mesa mill will undergo closure in 2014 and will be replaced with the impoundments currently under construction that meet the phased disposal work practice standard. Therefore, there is no reason not to subject these older impoundments to the work practice standards required for impoundments designed or constructed after December 15, 1989. By incorporating these impoundments under the work practices provision of Subpart W, it is no longer necessary to require radon flux monitoring, and we are proposing to eliminate that requirement.

The proposed elimination of the monitoring requirement in 40 CFR 61.253 applies only to those facilities currently subject to the radon flux standard in 40 CFR 61.252(a), which applies to only the three conventional impoundments in existence prior to the original promulgation of Subpart W on December 15, 1989. While we are proposing to eliminate the radon monitoring requirement for these three impoundments under Subpart W, this action does not relieve the owner or operator of the uranium recovery facility of the monitoring and maintenance requirements of their operating license issued by the NRC or its Agreement States. These requirements are found at 10 CFR Part 40,

Appendix A, Criterion 8 and 8A. Additionally, NRC, through its Regulatory Guide 4.14, may also recommend incorporation of radionuclide air monitoring at operating facility boundaries.

Further, when the impoundments formally close they are subject to the radon monitoring requirements of 40 CFR 192.32(a)(3), also under the NRC licensing requirements.

From a cost standpoint, by not requiring radon monitoring we expect that for all three sites the total annual average cost savings would be $29,200, with a range from about $21,000 to $37,000. More details on economic costs can be found in Section IV.B of this preamble.

For the proposed rule we also evaluated the requirements of 40 CFR 192.32(a) as they pertain to the Subpart W standards. The requirements of 40 CFR 192.32(a) are included in the NRC's regulations and are reviewed for compliance by NRC during the licensing process for a uranium recovery facility. We determined that the requirements at 40 CFR 192.32(a)(1), which reference the RCRA requirements for design and operation of surface impoundments at 40 CFR 264.221, are the only requirements necessary for EPA to incorporate for Subpart W, as they are effective methods of containing tailings and protecting ground water while also limiting radon emissions. This liner requirement, described earlier in this preamble, remains in use for the permitting of hazardous waste land disposal units under RCRA. The requirements at 40 CFR 192.32(a)(1) contain safeguards to allow for the placement of tailings and yet provide an early warning system in the event of a leak in the liner system. We are therefore proposing to retain the two work practice standards and the requirements of 40 CFR 192.32(a)(1) as GACT for conventional impoundments because these methods for limiting radon emissions while also protecting ground water have proven effective for these types of impoundments.

2. Non-conventional impoundments where tailings are contained in ponds and covered by liquids.

Today we are proposing a GACT standard specifically for non-conventional impoundments where uranium byproduct materials are contained in ponds and covered by liquids. Common names for these structures may include, but are not limited to, impoundments and evaporation or holding ponds. These affected sources may be found at any of the three types of uranium recovery facilities.

These units meet the existing applicability criteria in 40 CFR 61.250 to classify them for regulation under Subpart W. The holding or evaporation ponds located at conventional mills, ISL facilities and potentially heap leach facilities contain uranium byproduct material, either in solid form or dissolved in solution, and therefore their emissions are regulated under Subpart W. As defined at 40 CFR 61.251(g), uranium byproduct material or tailings means the waste produced by the extraction or concentration of uranium from any ore processed primarily for its source material content. Therefore, emissions for the ponds at uranium recovery facilities that contain either uranium byproduct material in solid form or radionuclides dissolved in liquids are regulated under Subpart W. Today we are again stating that determination and proposing a GACT standard specifically for these impoundments.

Evaporation or holding ponds, while sometimes smaller in area than conventional impoundments, perform a basic task. They hold uranium byproduct material until it can be disposed. Our survey of existing ponds shows that they contain liquids, and, as such, this general practice has been sufficient to limit the amount of radon emitted from the ponds, in many cases, to almost zero. Because of the low potential for radon emissions from these impoundments, we do not believe it is necessary to monitor them for radon emissions. We have found that as long as approximately one meter of liquid is maintained in the pond, the effective radon emissions from the pond are so low that it is difficult to determine whether there is any contribution above background radon values. EPA has stated in the ***Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings: Background Information Document*** (August, 1986):

> "Recent technical assessments of radon emission rates from tailings indicate that radon emissions from tailings covered with less than one meter of water, or merely saturated with water, are about 2% of emissions from dry tailings. Tailings covered with more than one meter of water are estimated to have a zero emissions rate. The Agency believes this calculated difference between 0% and 2% is negligible. The Agency used an emission rate of zero for all tailings covered with water or saturated with water in estimating radon emissions."

Therefore, we are proposing as GACT that these impoundments meet the design and construction requirements of 40 CFR 192.32(a)(1), with no size/area restriction, and that during the active life of the pond at least one meter of liquid be maintained in the pond.

We are also proposing that no monitoring be required for this type of impoundment. We have received information and collected data that show there is no acceptable radon flux test method for a pond holding a large amount of liquid. (Method 115 does not work because a solid surface is needed to place the large area activated carbon canisters used in the Method). Further, even if there was an acceptable method, we recognize that radon emissions from the pond would be expected to be very low because the liquid acts as an effective barrier to radon emissions; given that radon-222 has a very short half-life (3.8 days), there simply is not enough time for most of the radon produced by the solids or from solution to migrate to the water surface and cross the water/air interface before decaying(EPA-HQ-OAR-2008-0218-0087). It therefore appears that monitoring at these ponds is not necessary for demonstrating compliance with the proposed standards. We do, however, ask for comment and supporting information on three issues: (1) whether these impoundments need to be monitored with regard to their radon emissions, and why; (2) whether these impoundments need to be monitored to ensure at least one meter of liquid is maintained in the pond at all times, and (3) if these impoundments do need monitoring, what methods could a facility use (for example, what types of radon collection devices, or methods to measure liquid levels) at evaporation or holding ponds.

3. Heap Leach Piles.

The final impoundment category for which we are proposing GACT standards is heap leach piles. We are proposing to require that heap leach piles meet the phased disposal work practice standard set out in Section III B. 1. of this preamble (which limits an owner/operator to no more than two operating heap leach piles of no more than 40 acres each at any time) and the design and construction requirements at 40 CFR 192.32(a)(1) as GACT. We are also requiring heap leach piles to maintain minimum moisture content of 30% so that the byproduct material in the heap leach pile does not dry out, which would increase radon emissions from the heap leach pile.

As noted earlier in the preamble, there are currently no operating uranium heap leach facilities in the United States. We are aware that the one currently proposed heap leach facility will use the design and operating requirements at 40 CFR 192.32(a)(1) for the design of its heap. Since this requirement will be used at the only example we have for a heap leach pile, it (design and operating requirements at 40 CFR 192.32(a)(1)), along with the phased disposal work practice standard (limiting the number and size of heap leach piles), will be the standards that we propose as GACT for heap leach piles. The premise is that the operator of a heap would not want to lose any of the uranium-bearing solution; thus, it is cost effective to maintain a good liner system so that there will be no leakage and ground water will be protected. Also, use of the phased disposal work practice standard will limit the amount of exposed uranium byproduct material that would be available to emit radon. If we assume that uranium ore (found in the heap leach pile) and the resultant leftover byproduct material after processing emit radon at the same rate as uranium byproduct material in a conventional impoundment (a conservative estimate), we can also assume that the radon emissions will be nearly the same as two 40 acre conventional impoundments.

We recognize that owners and operators of conventional impoundments also limit the amount of radon emitted by keeping the tailings in the impoundments covered, either with soil or liquids. At the same time, however, we recognize that keeping the uranium byproduct material in the heap in a saturated or near-saturated state (in order to reduce radon emissions) is not a practical solution as it would be at a conventional tailings impoundment. In the definitions at 40 CFR 61.251(c) we have defined "dewatered" tailings as those where the water content of the tailings does not exceed 30% by weight. We are proposing today to require operating heaps to maintain moisture content of greater than 30% so that the byproduct material in the heap is not allowed to become dewatered which would allow more radon emissions. We are specifically asking for comment on the amount of liquid that should be required in the heap, and whether the 30% figure is a realistic objective. We are also asking for comments on precisely where in the heap leach pile this requirement must be met. The heap leach pile may not be evenly saturated during the uranium extraction process. The sprayer/drip system commonly used on the top of heap leach piles usually results in a semi-saturated moisture condition at the top of the pile, since flow of the lixiviant is not uniformly spread across the top of the pile. As downward flow continues, the internal areas of the pile become saturated. We are requesting information and comment on where specifically in the pile the 30% moisture content should apply.

C. What are the monitoring requirements?

As the rule currently exists, only mills with existing conventional impoundments in operation on or prior to December 15, 1989, are currently required to monitor to ensure compliance with the radon flux standard. The reason for this is because at the time of promulgation of the 1989 rule, EPA stated that no flux monitoring would be required for new impoundments because the proposed work practice standards would be effective in reducing radon emissions from operating impoundments by limiting the amount of tailings exposed (54 FR 51681). Since we have now determined that existing older conventional impoundments can meet one of the two work practice standards, we are proposing to eliminate the radon flux monitoring requirement.

In reviewing Subpart W we looked into whether we should extend radon monitoring to all affected sources constructed and operated after 1989 so that the monitoring requirement would apply to all conventional impoundments, non-conventional impoundments and heap leach piles containing uranium byproduct materials. We also reviewed how this requirement would apply to facilities where Method 115 is not applicable, such as at impoundments totally covered by liquids. We concluded that the original work practice standards (now proposed as GACT) continue to be an effective practice for the limiting of radon emissions from conventional impoundments and from heap leach piles. We also concluded that by maintaining an effective water cover on non-conventional impoundments the radon emissions from those impoundments are so low as to be difficult to differentiate from background radon levels at uranium recovery facilities. Therefore, we are proposing today that it is not necessary to require radon monitoring for any affected sources regulated under Subpart W. We seek comment on our conclusion that radon monitoring is not necessary for any of these sources as well as on any available cost-effective options for monitoring radon at non-conventional impoundments totally covered by liquids.

D. What are the notification, recordkeeping and reporting requirements?

New and existing affected sources are required to comply with the existing requirements of the General Provisions (40 CFR part 61, subpart A). The General Provisions include specific requirements for notifications, recordkeeping and reporting, including provisions for notification of construction and/or modification and startup as required by 40 CFR 61.07, 61.08 and 61.09.

Today we are also proposing that all affected sources will be required to maintain certain records pertaining to the design, construction and operation of the impoundments, both including conventional impoundments, and nonconventional impoundments, and heap leach piles. We are proposing that these records be retained at the facility and contain information demonstrating that the impoundments and/or heap leach pile meet the requirements in section 192.32(a)(1), including but not limited to, all tests performed that prove the liner is compatible with the material(s) being placed on the liner. For nonconventional impoundments we are proposing that this requirement would also include records showing compliance with the continuous one meter of liquid in the impoundment;[29] for heap leach piles, we are proposing that this requirement would include records showing that the 30% moisture content of the pile is continuously maintained. Documents showing that the impoundments and/or heap leach pile meet the requirements in section 192.32(a)(1) are already required as part of the pre-construction application submitted under 40 CFR 61.07, so these records should already be available. Records showing compliance with the one meter liquid cover requirement for nonconventional impoundments and records showing compliance with the 30% moisture level required in heap leach piles can be created and stored during the daily inspections of the tailings and waste retention systems required by the NRC (and Agreement States) under the inspection requirements of 10 CFR 40, Appendix A, Criterion 8A.

Because we are proposing new record-keeping requirements for uranium recovery facilities, we are required by the Paperwork Reduction Act (PRA) to prepare an estimate of the burden of such record-keeping on the regulated entity, in both cost and hours necessary to

[29] The one meter liquid requirement pertains to having one meter of liquid cover any and all solid byproduct material. We do not anticipate a large quantity of solid byproduct material in these nonconventional impoundments (EPA-HQ-OAR-2008-0218-0088).

comply with the requirements. We have submitted the Information Collection Request (ICR) containing this burden estimate and other supporting documentation to the Office of Management and Budget (OMB). See Section VII.B for more discussion of the PRA and ICR.

We believe the record-keeping requirements proposed today will not create a significant burden for operators of uranium recovery facilities. As described earlier, we are proposing to require retention of three types of records: (1) records demonstrating that the impoundments and/or heap leach pile meet the requirements in section 192.32(a)(1) (e.g. the design and liner testing information); (2) records showing that one meter of water is maintained to cover the byproduct material stored in nonconventional impoundments; and (3) records showing that heap leach piles maintain a moisture content of at least 30%.

Documents demonstrating that the affected sources comply with section 192.32(a)(1) requirements are necessary for the facility to obtain regulatory approval from NRC (or an NRC Agreement State) and EPA to construct and operate the affected sources (this includes any revisions during the period of operations). Therefore, these records will exist independent of Subpart W requirements and will not need to be continually updated as a result of this recordkeeping requirement in Subpart W; however, we are proposing to include this record-keeping requirement in Subpart W to require that the records be maintained at the facility during its operational lifetime (in some cases the records might be stored at a location away from the facility, such as corporate offices). This might necessitate creating copies of the original records and providing a location for storing them at the facility.

Keeping a record to provide confirmation that water to a depth of one meter is maintained above the byproduct material stored in nonconventional impoundments should also be relatively straightforward. This would involve placement of a measuring device or devices in or at the edge of the impoundment to allow observation of the water level relative to the level of byproduct material in the impoundment. Such devices need not be highly technical and might consist of, for example, measuring sticks with easily-observable markings placed at various locations, or marking the sides of the impoundment to illustrate different water depths. As noted earlier, NRC and Agreement State licenses require operators to inspect the facility on a daily basis. Limited effort should be necessary to make observations of water depth and record the information in inspection log books that are already kept on site and available to inspectors.

Similarly, daily inspections would provide a mechanism for recording moisture content of heap leach piles. However, because no heap leach facilities are currently operating, there is more uncertainty about exactly how the operator will determine that the heap has maintained a 30% moisture content. As discussed in more detail in Section IV.E.4 of this preamble, soil moisture probes are readily available and could be used for this purpose. Such probes could be either left in the heap leach pile, placed at locations that provide a representative estimate for the heap as a whole, or facility personnel could use handheld probes to collect readings. The facility might also employ mass-balance estimates to provide a further check on the data collected.

We estimate the burden in hours and cost for uranium recovery facilities to comply with the proposed recordkeeping requirements are as follows:

Table 1: Burden Hours and Costs for Proposed Recordkeeping Requirements (Annual figures except where noted)

Activity	Hours	Costs
Maintaining Records for the section 192.32(a)(1) requirements	20*	$1,360*

Verifying the one meter liquid requirement for nonconventional impoundments	288	$12,958
Verifying the 30% moisture content at heap leach piles using multiple soil probes	2,068	$86,548

*These figures represent a one-time cost to the facility.

Burden levels for heap leach piles are most uncertain because they depend on the chosen method of measurement (e.g., purchasing and maintaining multiple probes or a smaller number of handheld units) as well as the personnel training involved (e.g., a person using a handheld unit will likely need more training than someone who is simply recording readings from already-placed probes). We request comment on our estimates of burden, as well as suggestions of methods that could readily and efficiently be used to collect the required information. More discussion of the ICR and opportunities for comment may be found in Section VII.B.

E. When must I comply with these proposed standards?

All existing affected sources subject to this proposed rule would be required to comply with the rule requirements upon the date of publication of the final rule in the Federal Register. To our knowledge, there is no existing operating uranium recovery facility that would be required to modify its affected sources to meet the requirements of the final rule; however, we request any information regarding affected sources that would not meet these requirements. New sources would be required to comply with these rule requirements upon the date of publication of the final rule in the Federal Register or upon startup of the facility, whichever is later.

IV. Rationale for this Proposed Rule

A. How did we determine GACT?

As provided in CAA section 112(d)(5), we are proposing standards representing GACT for this area source category. In developing the proposed GACT standards, we evaluated the control technologies and management practices that are available to reduce HAP emissions from the affected sources and identified those that are generally available and utilized by operating uranium recovery facilities.

As noted in Section II.F., for this proposal we solicited information on the available controls and management practices for this area source category using written facility surveys (surveys authorized by section 114(a) of the CAA), reviews of published literature, and reviews of existing facilities (EPA-HQ-OAR-0218-0066). We also held discussions with trade association and industry representatives and other stakeholders at various public meetings.[30] Our determination of GACT is based on this information. We also considered costs and economic impacts in determining GACT (See Section VI.).

We identified two general management practices that reduce radon emissions from affected sources. These general management practices are currently being used at all existing uranium recovery facilities. First, limiting the area of exposed tailings in conventional impoundments limits the amount of radon that can be emitted. The work practice standards currently included in Subpart W require owners and operators of affected sources to implement this management practice by either limiting the number and area of existing, operating impoundments or covering dewatered tailings to allow for no more than 10 acres of exposed tailings. This is an existing requirement of Subpart W and of the NRC licensing requirements; hence, owners and operators of uranium recovery facilities are already incurring the costs associated with limiting the area of conventional impoundments (and as proposed, heap leach piles) to 40 acres or less (as well as no more than two conventional impoundments in operation at any one time), or

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[30] See http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html for a list of presentations made at public meetings held by EPA and at various conferences open to the public.

limiting the area of exposed tailings to no more than 10 acres.

Second, covering uranium byproduct materials with liquids is a general management practice that is an effective method for limiting radon emissions. This general management practice is often used at nonconventional impoundments, which, as stated earlier, are also known as evaporation or holding ponds. These nonconventional impoundments also contain byproduct material, and thus their HAP emissions are regulated under Subpart W. They are also regulated under the NRC operating license. While they hold mostly liquids, they are still designed and constructed in the manner of conventional impoundments, meaning they meet the requirements of section 192.32(a)(1). While this management practice of covering uranium byproduct materials in impoundments with liquids is not currently required under Subpart W, facilities using this practice have generally shown its effectiveness in reducing emissions in both conventional impoundments (that make use of phased disposal) and nonconventional impoundments (i.e. holding or evaporation ponds). We are therefore proposing to require the use of liquids in nonconventional impoundments as a way to limit radon emissions.

Therefore, after review of the available information and from the evidence we have examined, we have determined that a combination of the management practices listed above will be effective in limiting radon emissions from this source category, and will do so in a cost effective manner. We also believe that since heap leach piles are in many ways similar to the design of conventional impoundments, the same combination of work practices (limitation to no more than two operating heap leach piles, each one no more than 40 acres) will limit radon emissions in heap leach piles. We discuss our reasons supporting these conclusions in more detail in Section IV.B.

B. Proposed GACT standards for operating mill tailings.

1. Requirements at 40 CFR 192.32(a)(1)

As an initial matter, we determined that the requirements at 40 CFR 192.32(a)(1), which reference the RCRA requirements for the design and construction of liners at 40 CFR 264.221, continue to be an effective method of containment of tailings for all types of affected sources (EPA-HQ-OAR-2008-0218-0015). The liner requirements, described earlier in this document, remain in use for the permitting of hazardous waste land disposal units under RCRA. Because of the requirement for nearly impermeable boundaries between the tailings and the subsurface, and the requirement for leak detection between the liners, we have determined that the requirements contain enough safeguards to allow for the placement of tailings and also provide an early warning system in the event of a leak in the liner system (EPA-HQ-OAR-2008-0218-0015). For this reason we are proposing to require as GACT that conventional impoundments, non-conventional impoundments and heap leach piles all comply with the liner requirements in 40 CFR 192.32(a)(1). Previously, Subpart W contained this requirement but included a more general reference to 40 CFR 192.32(a); we are proposing to replace that general reference with a more specific reference to 40 CFR 192.32(a)(1) to narrow the requirements under this proposed rule to only the design and construction requirements for the liner of the impoundment contained in 40 CFR 192.32(a)(1).

The estimated average cost of the liner requirement for each type of impoundment at uranium recovery facilities is listed in the table below (EPA-HQ-OAR-2008-0218-0087):

Table 2: Estimated Liner Costs

Table 2: Proposed GACT Standards Costs per Pound of U_3O_8			
	Unit Cost ($/lb U_3O_8)		
	Conventional	ISL	Heap Leach
GACT – Double Liners for Nonconventional Impoundments	$1.04	$3.07	$0.22
GACT – Maintaining 1 Meter of Water in Nonconventional Impoundments	$0.013	$0.010	$0.0010
GACT – Liners for Heap Leach Piles	–	–	$2.01
GACT – Maintaining Heap Leach Piles at 30% Moisture	–	–	$0.0043
GACTs – Total for All Four	$1.05	$3.08	$2.24

Table 2 presents a summary of the unit cost (per pound of U_3O_8) for implementing each GACT at each of the three types of uranium recovery facilities. In addition to presenting the GACT costs individually, Table 2 presents the total unit cost to implement all relevant GACTs at each type of facility.

Based on the Table 2, implementing all four GACTs would result in unit cost (per pound of U_3O_8) increases of about 2%, 6%, and 5% at conventional mills, ISL, and heap leach type uranium recovery facilities, respectively.

In making these cost estimates, we have assumed the following: (1) a conventional impoundment is no larger than 40 acres in size, which is the maximum size allowed for the phased disposal option; (2) a nonconventional impoundment is no larger than 80 acres in size (the largest size we have seen); and (3) a heap leach pile is no larger than 40 acres in size (again, the maximum size allowed under the phased disposal work practice standard, although as with conventional impoundments the owner or operator is limited to two of these affected sources to be in operation at any time).

We do not have precise data for the costs associated with the liner requirements at conventional impoundments using the continuous disposal work practice standard because currently none exist, but a reasonable maximum approximation would be the costs for the 80 acre nonconventional impoundment, since it is the largest we have seen. We believe that no additional costs would be incurred for building a conventional impoundment that will use the continuous disposal option above what we estimated for building a nonconventional impoundment but we ask for comment on whether this assumption is reasonable. We also ask for data on the costs of building a conventional impoundment using continuous disposal, and how those costs would differ from the estimates provided above, or whether the costs we have listed for building a conventional impoundment using phased disposal are a reasonable approximation of the costs for building a conventional impoundment using continuous disposal.

These liner systems are already required by 40 CFR 192.32(a)(1), which, as explained above, are requirements promulgated by EPA under UMTRCA that are incorporated into NRC regulations and implemented and enforced by NRC and NRC Agreement States through their licensing requirements. Therefore, we are not placing any additional liner requirements on facilities or requiring them to incur any additional costs to build their conventional or nonconventional impoundments or heap leach piles above and beyond what an owner or operator of these impoundments must already incur to obtain an NRC or NRC Agreement State license.

The liner systems we are proposing that heap leach piles must use are the same as those used for conventional and nonconventional impoundments. We estimate that the average costs associated with the construction of a 40 acre liner that complies with 40 CFR 192.32(a)(1)is approximately $15.3 million. When compared to the baseline capital costs associated with the facility (estimated at $356 million)(EPA-HQ-OAR-2008-0218-0087), the costs for constructing this type of liner system per facility is about 4% of the total baseline capital costs of a heap leach pile facility (EPA-HQ-OAR-2008-0218-0087).[31]

2. Conventional Impoundments.

In the 1989 promulgation of Subpart W we required new conventional impoundments to comply with one of two work practice standards, phased disposal or continuous disposal. These work practice standards contain specific limits on the exposed area and/or number of operating conventional impoundments to limit radon emissions because we recognized that radon emissions from very large impoundments could impose unacceptable health effects if the piles were left dry and uncovered. We are proposing as the GACT standard that <u>all</u> conventional impoundments – both existing impoundments and new impoundments - comply with one of the two work practice standards, phased disposal or continuous

[31] For our purposes, baseline conditions are defined as a reference point that reflects the world without the proposed regulation. It is the starting point for conducting an economic analysis of the potential benefits and costs of a proposed regulation. The defined baseline influences first the level of emissions expected without regulatory intervention. It thereby also influences the projected level of emissions reduction that may be achieved as a consequence of the proposed regulation. Baselines have no standard definition besides the fact that they simply provide a reference scenario against which changes in economic and environmental conditions (in this case radon emissions) can be measured. In some instances, baselines have been established based on the assumption that economic, environmental and/or other conditions will continue on the present path or trend, purely as time dependant extensions of presently observed patterns. In other instances, baselines are derived from elaborate modeling projections. Because in all cases their purpose is to project a view of the world without the proposed regulatory intervention, baselines are sometimes termed "do nothing" or "business as usual" scenarios.

disposal, because these methods for limiting radon emissions by limiting the area of exposed tailings continue to be effective methods for reducing radon emissions from these impoundments (reference EPA 520-1-86-009, August 1986). We are proposing that existing impoundments also comply with one of the two work practice standards because, as discussed earlier, we no longer believe that a distinction needs to be made for conventional impoundments based on the date when they were designed and/or constructed.

We are also not aware of any conventional impoundments either in existence or planned that use any other technologies or management practices to reduce radon emissions. Operators continue to use the general management practices discussed above for reducing radon emissions from their conventional impoundments, i.e., limiting the size and/or number of the impoundments, and covering the tailings with soil or keeping the tailings wet. These management practices form the basis of the work practice standards for conventional impoundments and continue to be very effective methods for limiting the amount of radon released to the environment.

These work practice standards are a cost-effective method for reducing radon emissions from conventional impoundments. In addition, the liner requirements for conventional impoundments are also required by the NRC in their licensing requirements at 10 CFR part 40. Therefore, we are proposing that GACT for conventional impoundments will be the same work practice standards as were previously included in Subpart W.

3. Non-conventional Impoundments where Tailings are Contained in Ponds and Covered by Liquids

Today we are proposing a GACT standard specifically for use by any operating uranium recovery facility that has one or more non-conventional impoundments at its facility (i.e., those impoundments where tailings are contained in ponds and covered by liquids). Common names for these structures may include, but are not limited to, impoundments, evaporation ponds and holding ponds. These ponds contain uranium byproduct material and the HAP emissions are regulated by Subpart W.

Industry has argued in preambles to responses to the CAA section 114(a) letters[32] and elsewhere that Subpart W does not, and was never meant to, include these types of evaporation or holding ponds under the Subpart W requirements. Industry has asserted that the original

[32] http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html.

Subpart W did not specifically reference evaporation or holding ponds but was regulating only conventional mill tailings impoundments. They argue that the ponds are temporary because they hold very little solid material but instead hold mostly liquids containing dissolved radionuclides (which emit very little radon), and at the end of the facility's life they are drained, and any solid materials, along with the liner system, are disposed in a properly licensed conventional impoundment.

EPA has consistently maintained that these non-conventional impoundments meet the existing applicability criteria for regulation under Subpart W. As defined at 40 CFR 61.251(g), uranium byproduct material or tailings means the waste produced by the extraction or concentration of uranium from any ore processed primarily for its source material content. The holding or evaporation ponds located at conventional mills, ISL facilities and potentially heap leach facilities contain uranium byproduct materials, either in solid form or dissolved in solution, and therefore their HAP emissions are regulated under Subpart W. Today we reiterate that position and are proposing a GACT standard more specifically tailored for these types of impoundments.

We are proposing that these non-conventional impoundments (the evaporation or holding ponds) must maintain a liquid level in the impoundment of no less than one meter at all times during the operation of the impoundment. Maintaining this liquid level will ensure that radon-222 emissions from the uranium byproduct material in the pond are minimized. We are also proposing that there is no maximum area requirement for the size of these ponds since the chance of radon emissions is small. Our basis for this determination is that radon emissions from the pond will be expected to be very low since the liquid in the ponds acts as an effective barrier to radon emissions; given that radon-222 has a very short half-life (3.8 days), there simply is not enough time for approximately 98% of the radon produced by the solids or from the solution to migrate to the water surface and cross the water/air interface before decaying.

By requiring a minimum of one meter of water in all nonconventional impoundments that contain uranium byproduct material, the release of radon from these impoundments would be greatly reduced. Nielson and Rogers (1986) present the following equation for calculating the radon attenuation:

$$A = e^{\left(-\left[\frac{\lambda}{D}\right]^{0.5} d\right)}$$

Where:

	A	=	Radon attenuation factor (unit less)
	λ	=	Radon-222 decay constant (sec^{-1})
		=	2.1×10^{-6} sec^{-1}
	D	=	Radon diffusion coefficient (cm^2/sec)
		=	0.003 cm^2/sec in water
	d	=	Depth of water (cm)
		=	100 cm

The above equation indicates that the attenuation of radon emanation by water (i.e., the amount by which a water cover will decrease the amount of radon emitted from the impoundment) depends on how quickly radon-222 decays, how quickly radon-222 can move through water (the diffusion coefficient), and the thickness of the layer of water.[33] Solving the above equation shows that one meter of water has a radon attenuation factor of about 0.07. That is, emissions can be expected to be reduced by about 93% compared to no water cover.

The benefit incurred by this requirement is that significantly less radon will be released to the atmosphere. The amount varies from facility to facility based on the size of the nonconventional impoundment, but

[33] For a detailed discussion of this topic, which includes the effects of pond water mixing, wind and convection, please see "Risk Assessment Revision for 40 CFR Part 61 Subpart W-Radon Emissions from Operating Mill Tailings, Task 5 Radon Emission from Evaporation Ponds,"(EPA-HQ-OAR-2008-0218-0080).

across existing facilities radon can be expected to be reduced by approximately 24,600 curies, a decline of approximately 93%.

The estimated cost associated with complying with the proposed one meter of liquid that would be required to limit the amount of radon emissions to the air vary according to the size of the impoundment and the geographic area in which it is located. We estimate that this requirement will cost owners or operators of 80 acre nonconventional impoundments between $1,042 and $9,687 per year. This value varies according to the location of the impoundment, which will determine evaporation rates, which determines how much replacement water will be required to maintain the minimum amount of one meter. If the evaporated water is not replaced by naturally occurring precipitation, then it would need to be replaced with make-up water supplied by the nonconventional impoundment’s operator.

The most obvious source of water is what is known as “process water” from the extraction of uranium from the subsurface. Indeed, management of this process water is one of the primary reasons for constructing the impoundment in the first place, as the process water contains uranium byproduct material that must also be managed by the facility. It is possible that an operator could maintain one meter of water in the impoundment solely through the use of process water. If so, this would not create any additional costs for the facility as the cost of the process water can be attributed to its use in the uranium extraction process. However, for purposes of estimating the economic impacts associated with our proposal, our cost estimate does not include process water as a source of water potentially added to the impoundment to replace water that has evaporated. Instead, we estimated the costs of using water from other sources. This method results in the most conservative cost estimate for compliance with the one meter requirement.

In performing the cost impacts for this requirement, three potential sources of impoundment make-up water were considered: (1) municipal water suppliers; (2) offsite non-drinking-water suppliers; and (3) on-site water (EPA-HQ-OAR-2008-0218-0087). Depending on the source of water chosen, we estimate that this requirement will cost owners or operators of nonconventional impoundments between \$1,042.00 and \$9,687.00 per year.[34]

[34] Municipal sources were the most expensive, with average unit costs of \$0.0033 per gallon. Offsite non-drinking water sources were the cheapest, at \$0.000069 per gallon on average. Various references were used for the comparisons. For more detail, please see Section 6.3.3 of the Background Information Document.

This value also varies according to the size and location of the nonconventional impoundment. Such impoundments currently range up to 80 acres in size. The requirement to maintain a minimum of one meter of liquid in the ponds is estimated to cost approximately $0.03 per pound of uranium produced. The annual cost of makeup water was divided by the base case facility yellowcake annual production rate to calculate the makeup water cost per pound of yellowcake produced (EPA-HQ-OAR-2008-0218-0087). We conclude that this proposed requirement is a cost-effective way to significantly reduce radon emissions from nonconventional impoundments, and is therefore appropriate to propose as a GACT standard for nonconventional impoundments.

4. Heap Leach Piles

The final affected source type for which we are proposing GACT standards is heap leach piles. While there are currently no operating uranium heap leach facilities in the United States, we are proposing to regulate the HAP emission at any future facilities using this type of uranium extraction under Subpart W since the moment that uranium extraction takes place in the heap, uranium byproduct materials are left behind. During the process of uranium extraction on a heap, as the acid drips through the ore, uranium is solubilized and carried away to the collection system where it is further processed. At the point of uranium movement out of the heap, what remains is uranium byproduct materials as defined by 40 CFR 61.251(g). In other words, what remains in the heap is the waste produced by the extraction or concentration of uranium from ore processed primarily for its source material content. Thus, Subpart W applies because uranium byproduct materials are being generated during and following the processing of the uranium ore in the heap.

As a result, we are proposing GACT standards for heap leach piles. We are proposing that these piles conform to the phased disposal work practice standard specified for conventional impoundments in 40 CFR 61.252(a)(1)(i)(which limits the number of active heap leach piles to two, and limits the size of each one to no more than 40 acres) and that the moisture content of the uranium byproduct material in the heap leach pile be greater than or equal to 30% moisture content. We believe that the phased disposal approach can be usefully applied here because it limits the amount of tailings that can be exposed at any one time, which limits the amount of radon that can be emitted. The phased disposal work practice standard is applicable for heap leach piles because heap leach piles are expected to be managed in a manner that is similar in many respects to conventional impoundments. Based on what we understand about the operation of potential future heap leach facilities, after the uranium has been removed from the heap leach pile, the uranium byproduct material that remains would be contained in the heap leach structure which would be lined according to the requirements of 40 CFR 192.32(a)(1). The heap leach pile would also be covered with soil at the end of its operational life to minimize radon emissions.

This is what is required to occur at conventional impoundments using the phased disposal standard. Limiting the size of the operating heap leach pile to 40 acres or less (and the number of operating heap leach piles at any one time to two) has the same effect as it does on conventional impoundments; that is, it limits the area of exposed uranium byproduct material and therefore limits the radon emissions from the heap leach pile. While we believe that the 40 acre limitation is appropriate for heap leach piles, we are requesting comment on what should be the maximum size (area) of a heap leach pile.

We are also proposing as GACT that the heap leach pile constantly maintain a moisture content of at least 30% by weight. By requiring a moisture content of at least 30%, the byproduct material in the heap leach pile will not become dewatered, and we think that the heap leach pile will be sufficiently saturated with liquid to reduce the amount of radon that can escape from the heap leach pile. However, we request further information on all the chemical mechanisms in place during the leaching operation, and whether the 30% moisture content is sufficient for minimizing radon emissions from the heap leach pile. We also request comment on the amount of time the 30% moisture requirement should be maintained by a facility. We are proposing the term "operational life" of the facility. We are aware of several operations that take place during the uranium extraction process at a heap leach pile. After an initial period of several months of allowing lixiviant to leach uranium from the pile, the heap leach pile is allowed to "rest," which enables the geochemistry in the pile to equilibrate. At that point the heap leach pile may be subjected to another round of extraction by lixiviant, or it may be rinsed to flush out any remaining uranium that is in solution in the heap leach pile. After the rinsing, the pile is allowed to drain and a radon barrier required by 40 CFR 192.32 can be emplaced. We are proposing that the operational life of the heap leach pile be from the time that lixiviant is first placed on the heap leach pile until the time of the final rinse. We believe this incorporates a majority of the time when the heap leach pile is uncovered (no radon barrier has been constructed over the top of the heap) and when the ability for radon to be emitted is the greatest.

Because there is no “process water” component to a heap leach operation, as there is for an ISL, water for the heap leach pile must be supplied from an outside source. Even if an ISL and heap leach operation were to be located at the same site, we consider it unlikely that an operator would use ISL process water as the basis for an acidic heap leach solution. It is possible, in fact likely, that the solution used in the heap will be recycled (i.e., applied to the heap more than once), which could reduce the amount of outside water needed to some degree, although as we discuss later in this section, it would not seem that recycling solution would affect the overall moisture content. In calculating the high-end costs of heap leaching, we have not included this possibility in our estimates of economic impacts.

The unit costs for providing liquids to a heap leach pile are assumed to be the same as the unit costs developed for providing water to nonconventional impoundments. In estimating the cost impacts for this requirement, three potential sources of impoundment make-up water were considered: (1) municipal water suppliers; (2) offsite non-drinking-water suppliers; and (3) on-site water. The only cost associated with maintaining the moisture level within the pile is the cost of the liquid. We assume that existing piping used to supply lixiviant to the pile during leaching would be used to supply water necessary for maintaining the moisture level. Also, we assume that the facility will use the in-soil method for moisture monitoring. The in-soil method and its costs are described below.

Soil moisture sensors have been used for laboratory and outdoor testing purposes and for agricultural applications for over 50 years. They are mostly used to measure moisture in gardens and lawns to determine when it is appropriate to turn on irrigation systems. Soil moisture sensors can either be placed in the soil or held by hand.

For example, one system would bury soil moisture sensors to the desired depth in the heap. Then, a portable soil moisture meter would be connected by cable to each buried sensor one at a time, i.e., a single meter can read any number of sensors. The portable soil moisture meter costs about $350, and each in-soil sensor about $35 or $45, depending on the length of the cable (either 5 or 10 ft). Finally, it is assumed that moisture readings would be performed during the NRC required daily inspections of the heap leach pile, which would require approximately 2,000 additional work hours per year per facility. Our estimates for costs of monitoring the heap include 100 sensors located within the heap, with a meter on each sensor. We chose 100 sampling stations because heaps are generally the same size as conventional impoundments, and Method 115 prescribed 100 measurements for the tailings area of a conventional impoundment. The total estimated costs for using this system, including labor, are approximately $86,500 per year per facility.

Alternatively, with a handheld soil moisture meter, two rods (up to 8 inches long) that are attached to the meter are driven into the soil at the desired location, and a reading is taken. A handheld meter of this type costs about $1,065, and replacement rods about $58 for a pair. A minimum of 100 sampling stations for measuring radon could be required. We did not estimate costs for this method, as we concluded that the length of time required walking around a heap leach pile and obtaining these measurements required more time than is found in an average work day, and would expose workers to potentially hazardous constituents contained in the lixiviant.

The base case heap leach facility includes a heap leach pile that will occupy up to 80 acres at a height of up to 50 feet. With an assumed porosity of 0.39 and a moisture content of 30% by weight, the effective surface area of the liquid within the heap pile is 33.7 acres.

Table 3 presents the calculated cost for make-up water to maintain the moisture level in the heap leach pile, such that the moisture content is at 30% by weight, or greater. The unit costs for water and the net evaporation rates used for these estimates are identical to those derived for evaporation ponds.

Table 3: Heap Leach Pile Annual Makeup Water Cost

Cost Type	Water Cost ($/gal)	Net Evaporation (in/yr)	Makeup Water Cost ($/yr)	Makeup Water Rate (gpm/ft^2)
Mean	$0.00010	45.7	$4,331	2.3E-05
Median	$0.00010	41.3	$3,946	2.1E-05
Minimum	$0.000035	6.1	$196	3.0E-06
Maximum	$0.00015	96.5	$13,318	4.8E-05

To place this amount of make-up water in perspective, during leaching and rinsing of the heap leach pile, liquid is dripped onto the pile at a rate of 0.005 gallons per minute per square foot (gpm/ft^2). This rate is significantly higher than the make-up water rates necessary to maintain the moisture content at 30% by weight, shown in Table 3. We conclude from this analysis that the leaching solution applied in a typical operation should be sufficient to maintain the moisture content of the heap leach pile to the required levels, and only in unusual circumstances (such as during the final rinse and draindown of the heap leach pile) would additional liquids need to be applied. However, in a circumstance that would require the additional application of liquid to maintain the 30% moisture limit, such as excessive evaporation, we estimate that the cost of requiring the owner/operator of a heap leach pile to maintain 30% moisture content in the pile will average approximately $4,000 per year.

We are asking for comment on exactly where in the pile the 30% moisture content should be achieved. We are also soliciting comments on whether the leaching operation itself liberates more radon into the air than the equivalent of a conventional impoundment. We assume that because low-grade ore is usually processed by heap leach, there would be less radon emitted from a heap leach pile than from a conventional impoundment of similar size. We request information on whether this is a correct assumption.

We are also aware that there could be a competing argument against regulating the heap leach pile under Subpart W while the lixiviant is being placed on the heap leach pile. While not directly correlative, the process of heap leach could be defined as active "milling." The procedure being carried out on the heap is the extraction of uranium. In this view, the operation is focused on the production of uranium rather than on managing uranium byproduct materials. Therefore, under this view, the heap meets the definition of tailings under 40 CFR 61.251(g) only after the final rinse of the heap solutions occurs and the heap is preparing to close. In this scenario the heap leach pile would close under the requirements at 40 CFR part 192.32 and Subpart W would never apply. We are requesting comments on the relative merits of this interpretation.

It bears noting that, as with ISL facilities, collection and/or evaporation ponds (nonconventional impoundments) may exist at heap leach facilities that will also contain uranium byproduct materials. These ponds' HAP emissions will be regulated under Subpart W regardless of whether the heap leach pile is also subject to regulation under that subpart.

V. Other Issues Generated by Our Review of Subpart W

During our review of Subpart W we also identified several issues that need clarification in order to be more fully understood. The issues that we have identified are:

- Clarification of the term "standby" and how it relates to the operational phase of an impoundment;
- Amending the definition of "operation" of an impoundment so that it is clear when the owner or operator is subject to the requirements of Subpart W;
- Determining whether Subpart W adequately addresses protection from extreme weather events;
- Revising 40 CFR 61.252(b) and (c) to accurately reflect that it is only 40 CFR 192.32(a)(1)that is applicable to Subpart W; and
- Removing the phrase "as determined by the Nuclear Regulatory Commission" in 40 CFR 61.252(b)(1) and (2).

A. Clarification of the Term "Standby"

There has been some confusion over whether the requirements of Subpart W apply to an impoundment that is in "standby" mode. This is the period of time that an impoundment may not be accepting tailings, but has not yet entered the "closure period" as defined by 40 CFR 192.31(h). This period of time usually takes place when the price of uranium is such that it may not be cost effective for the uranium recovery facility to continue operations, and yet the facility has not surrendered its operating license, and may re-establish operations once the price of uranium rises to a point where it is cost effective to do so. Since the impoundment has not entered the closure period, it could continue to accept tailings at any time; therefore, Subpart W requirements continue to apply to the impoundment.

Today we are proposing to add a definition to 40 CFR 61.251 to define “standby” as:

> Standby means the period of time that an impoundment may not be accepting uranium byproduct materials but has not yet entered the closure period.

B. Amending the definition of “Operation” for a conventional impoundment

As currently written, 40 CFR 61.251(e) defines the operational period of a tailings impoundment. It states that “operation” means that an impoundment is being used for the continuing placement of new tailings or is in standby status for such placement (which means that as long as the facility has generated byproduct material at some point and placed it in an impoundment, it is subject to the requirements of Subpart W). An impoundment is in operation from the day that tailings are first placed in the impoundment until the day that final closure begins.

There has been some confusion over this definition. For example, a uranium mill announced that it was closing a pre-December 15, 1989, impoundment. Before initiating closure, however, it stated that it would keep the impoundment open to dispose of material generated by other closure activities at the site that contained byproduct material (liners, deconstruction material, etc) but not “new tailings.” The company argued that since it was not disposing of new tailings the impoundment was no longer subject to Subpart W. We disagree with this interpretation. While it may be true that the company was no longer disposing of new tailings in the impoundment, it has not begun closure activities; therefore, the impoundment is still open to disposal of byproduct material that emits radon and continues to be subject to all applicable Subpart W requirements.

To prevent future confusion, we are proposing today to amend the definition of “operation” in the Subpart W definitions at 40 CFR 61.251 as follows:

Operation means that an impoundment is being used for the continued placement of uranium byproduct material or tailings or is in standby status for such placement. An impoundment is in operation from the day that uranium byproduct materials or tailings are first placed in the impoundment until the day that final closure begins.

C. Weather Events

In the past, uranium recovery facilities have been located in the western regions of the United States. In these areas, the annual precipitation falling on the impoundment, and any drainage area contributing surface runoff to the impoundment, has usually been less than the annual evaporation from the impoundment. Also, these facilities have been located away from regions of the country where extreme rainfall events (e.g., hurricanes or flooding) could jeopardize the structural integrity of the impoundment, although there is a potential for these facilities to be affected by flash floods, tornadoes, etc. Now, however, uranium exploration and recovery in the U.S. has the potential to move eastward, into more climatologically temperate regions of the country, with south central Virginia being considered for a conventional uranium mill. In determining whether additional measures would be needed for impoundments operating in areas where precipitation exceeds evaporation, a review of the existing requirements was necessary.

The proposed revisions to Subpart W will continue to require owners and operators of all impoundments to follow the requirements of 40 CFR 192.32(a)(1). That particular regulation references the RCRA surface impoundment design and operations requirements of 40 CFR 264.221. At 40 CFR 264.221(g) and (h) are requirements that ensure proper design and operation of tailings impoundments. Section

264.221(g) states that impoundments must be designed, constructed, maintained and operated to prevent overtopping resulting from normal or abnormal operations; overfilling; wind and rain action (e.g., a two foot freeboard requirement); rainfall; run-on; malfunctions of level controllers, alarms and other equipment; and human error. Section 264.221(h) states that impoundments must have dikes that are designed, constructed and maintained with sufficient structural integrity to prevent massive failure of the dikes. In ensuring structural integrity, it must not be presumed that the liner system will function without leakage during the active life of the unit.

Since impoundments at uranium recovery facilities have been and will continue to be required to comply with the requirements of 40 CFR 192.32(a)(1), they are already required to be designed to prevent failure during extreme weather events. As we stated in Section IV B.2., we believe the requirements of 40 CFR 192.32(a)(1) contain enough safeguards to allow for the placement of tailings and yet provide an early warning system in the event of a leak in the liner system. Therefore, we are proposing to include these requirements in the Subpart W requirements without modification.

D. Applicability of 40 CFR 192.32(a) to Subpart W

The requirements at 40 CFR 61.252(b) and (c) require compliance with 40 CFR 192.32(a). However, we are now proposing to focus the Subpart W requirements on the impoundment design and construction requirements found specifically at 40 CFR 192.32(a)(1). The remainder of 40 CFR 192.32(a) goes beyond this limited scope by including requirements for ground-water detection monitoring systems and closure of operating impoundments. These other requirements, along with all of the part 192 standards, are implemented and enforced by the NRC through its licensing requirements for uranium recovery facilities at 10 CFR part 40, Appendix A. However, when referenced in Subpart W, the requirements in 40 CFR 192.32(a)(1) would also be implemented and enforced by EPA as the regulatory authority administering Subpart W under its CAA authority. Therefore today we are proposing to revise 40 CFR 61.252 (b) and (c) to specifically define which portions of 40 CFR 192.32(a) are applicable to Subpart W. At the same time we are proposing to eliminate the phrase "…as determined by the Nuclear Regulatory Commission" from 40 CFR 61.252(b). This should eliminate confusion regarding what an applicant must submit to EPA under the CAA in its pre-construction and modification approval applications as required by 40 CFR 61.07, and better explain that EPA is the regulatory agency administering Subpart W under the CAA. This proposed change will have no effect on the licensing requirements of the NRC or its regulatory authority under UMTRCA to implement the part 192 standards through its licenses.

VI. Summary of Environmental, Cost and Economic Impacts

As discussed earlier, uranium recovery activities are carried out at several different types of facilities. We are proposing to revise Subpart W based on how uranium recovery facilities manage uranium byproduct materials during and after the processing of uranium ore at their particular facility. As discussed in Sections III and IV, we are proposing GACT requirements for three types of affected sources at uranium recovery facilities: (1) conventional impoundments; (2) nonconventional impoundments; and (3) heap leach piles.

For purposes of analyzing the impacts of the proposed rule, we assumed that approximately five conventional milling facilities, 50 ISL facilities (although this is only a projection since only 12 currently exist) and one heap leach facility, each with at least one regulated impoundment, would become subject to the proposed rule. The following sections present our estimates of the proposed rule’s air quality, cost and economic impacts. For more information, please refer to the Economic Impact Analysis report that is included in the public docket for this proposed rule (EPA-HQ-OAR-2008-0218-0087).

A. What are the air quality impacts?

We project that the proposed requirements will maintain or improve air quality surrounding the regulated facilities. The GACT standards being proposed today are based on control technologies and management practices that have been used at uranium recovery facilities for the past twenty or more years. These standards will minimize the amount of radon that is released to the air by keeping the impoundments wet or covered with soil and/or by limiting the area of exposed tailings. The requirements in this proposed rule should eliminate or reduce radon emissions at all three types of affected sources.

B. What are the cost and economic impacts?

Table 2~~Table~~ 4 presents a summary of the unit cost (per pound of U_3O_8) for implementing each GACT at each of the three types of uranium recovery facilities. In addition to presenting the GACT costs individually, Table 2~~Table~~ 4 presents the total unit cost to implement all relevant GACTs at each type of facility.

A reference facility for each type of uranium recovery facility is developed and described in Section 6.2, including the base cost estimate to construct and operate (without the GACTs) each of the three types of reference facilities. For comparison purposes, the unit cost (per pound of U_3O_8) of the three uranium recovery reference facilities is presented at the bottom of Table 4.

Table 4: Proposed GACT Standards Costs per Pound of U_3O_8			
	Unit Cost (\$/lb U_3O_8)		
	Conventional	ISL	Heap Leach
GACT – Double Liners for Nonconventional Impoundments	\$1.04	\$3.07	\$0.22
GACT – Maintaining 1 Meter of Water in Nonconventional Impoundments	\$0.013	\$0.010	\$0.0010
GACT – Liners for Heap Leach Piles	–	–	\$2.01
GACT – Maintaining Heap Leach Piles at 30% Moisture	–	–	\$0.0043
GACTs – Total for All Four	\$1.05	\$3.08	\$2.24
Baseline Facility Costs (Section 6.2)	\$51.56	\$52.49	\$46.08

Based on the information in Table 2~~Table~~ 4, implementing all four GACTs would result in unit cost (per pound of U_3O_8) increases of about 2%, 6%, and 5% at conventional, ISL, and heap leach type uranium recovery facilities, respectively.

The baseline costs were estimated using recently published cost data for actual uranium recovery facilities. For the model conventional mill, we used data from the recently licensed new mill at the Piñon Ridge project in

Colorado. For the model ISL facility, we used data from two proposed new facilities: (1) the Centennial Uranium project in Colorado; and (2) the Dewey-Burdock project in South Dakota. The Centennial project is expected to have a 14- to 15-year production period, which is a long duration for an ISL facility, while the Dewey-Burdock project is expected to have a shorter production period of about 9 years, which is more representative of ISL facilities. For the heap leach facility, we used data from the proposed Sheep Mountain project in Wyoming.

Existing Subpart W required facilities to perform annual monitoring using Method 115 to demonstrate that the radon flux standard at conventional impoundments constructed before December 15, 1989 was below 20 pCi/m^2-sec. The proposed removal of this monitoring requirement would result in a cost saving to the three facilities for which this requirement still applies: (1) Sweetwater; (2) White Mesa; and (3) Shootaring Canyon. Method 115 requires 100 measurements as the minimum number of flux measurements considered necessary to determine a representative mean radon flux value. For the three sites that are still required to perform Method 115 radon flux monitoring, the average annual cost to perform that monitoring is estimated to be about $9,730 for Shootaring and Sweetwater, and

$19,460 for White Mesa. For all three sites the total annual average cost is estimated to be $38,920 per year, with a range from approximately $28,000 to $49,500 per year. For all three sites the total annual average cost savings resulting from removal of the flux monitoring requirement would be $39,920.

Baseline costs (explained in Section IV.B) for conventional impoundment liner construction[35] will remain the same, since the proposed rule does not impose additional requirements. Liners meeting the requirements at 40 CFR 192.32(a)(1) are already mandated by other regulations and, therefore, built into the baseline cost estimate. Therefore there are consequently no costs (or benefits) resulting from the inclusion of these requirements in Subpart W.

The average cost to construct one of these impoundments is $13.8 million. We estimate that this cost

[35] These liner systems (conventional, nonconventional and heap leach piles)are already required by 40 CFR 192.32(a)(1), which, as explained above, are requirements promulgated by EPA under UMTRCA that are incorporated into NRC regulations and implemented and enforced by NRC through their licensing requirements. Therefore, we are not placing any additional liner requirements on facilities or requiring them to incur any additional costs to build their conventional or nonconventional impoundments or heap leach piles above and beyond what an owner or operator of these impoundments must already incur to obtain an NRC license. Therefore, there are no projected costs (or benefits) beyond the baseline resulting from the inclusion of these requirements in Subpart W.

is approximately 3% of the total baseline capital costs to construct a conventional mill, estimated at $372 million.

We have estimated that for an average 80 acre nonconventional impoundment the average cost of construction of an impoundment is $23.7 million. Requiring impoundments to comply with the liner requirements in 40 CFR 192.32(a)(1) will contain the uranium byproduct material and reduce the potential for ground water contamination. The only economic impact attributable to the proposed rule is the cost of complying with the new requirement to maintain a minimum of one meter of water in the nonconventional impoundments during operation and standby. As shown in Section IV.B.3. of this preamble, as long as approximately one meter of water is maintained in the nonconventional impoundments the effective radon emissions from the ponds are so low that it is difficult to determine if there is any contribution above background radon values. In order to maintain one meter of liquid within a pond, it is necessary to replace the water that is evaporated from the pond. Depending on the source of water chosen,[36] we estimate that this requirement will cost owners

[36] Municipal sources were the most expensive, with average unit costs of $0.0033 per gallon. Offsite non-drinking water sources were the cheapest, at $0.000069 per gallon on average. For more detail, please see Section 6.3.3 of the Background Information Document.

or operators of nonconventional impoundments between $1,042 and $9,687 per year. This value also varies according to the size of the nonconventional impoundment, up to 80 acres, and the location of the impoundment. Evaporation rates vary by geographic location. However, the cost to maintain the one meter of liquid in a nonconventional impoundment is estimated to be less than 1% of the total annual production costs, estimated at $23.7 million. The requirement to maintain a minimum of one meter of liquid in the ponds is estimated to cost approximately $0.03 per pound of uranium produced.

Designing and constructing heap leach piles to meet the requirements at 40 CFR 192.32(a)(1) would minimize the potential for leakage of uranium enriched lixiviant into the ground water. Specifically, this would require that a double liner, with drainage collection capabilities, be provided under heap leach piles. Baseline costs (explained in Section IV.B) for heap leach pile liner construction will remain the same, since the proposed rule does not impose additional requirements. Liners meeting the requirements at 40 CFR 192.32(a)(1) are already mandated by other regulations and, therefore, built into the baseline cost estimate. Therefore there are consequently no costs (or benefits) resulting from the inclusion of these requirements in Subpart W. Baseline costs for construction will be essentially the same as for conventional impoundments. Since the liner systems are equivalent to the systems used for conventional and nonconventional impoundments, we have been able to estimate the average costs associated with the construction of heap leach pile impoundments that meet the liner requirements we are proposing, and compare them to the costs associated with the total production of uranium produced by the facility. The average cost of constructing such an impoundment is estimated to be approximately $15.3 million. The costs of constructing this type of liner system are about 4% of the estimated total baseline capital costs of a heap leach facility estimated at $356 million.

For heap leach piles, when the soil moisture content in the heap leach pile falls below about 30% by weight, the radon flux out of the heap leach pile increases because radon moves through the air faster (with less opportunity to decay) than through water. We concluded from our analysis that the leaching solution applied in a typical operation should be sufficient to maintain the moisture content of the heap leach pile to the required levels, and only in unusual circumstances would additional liquids need to be applied. However, in a circumstance that would require the additional application of liquid to maintain the 30% moisture limit, such as excessive evaporation, we estimate that the cost of requiring the owner/operator of a heap leach pile to maintain 30% moisture content in the pile will average approximately $4,000 per year. We also estimate that it will cost approximately $86,500 per year (which includes labor of approximately 2,000 hours) to perform the tests required to verify that the moisture content is being maintained. These costs are less than one percent of the total baseline capital costs of a heap leach facility, estimated at $356 million.

In summary, we estimate that for conventional impoundments there will be no additional costs incurred through this proposed rule. There will be a cost savings of approximately $39,900 per year for the three existing conventional impoundments that are currently required to monitor for radon flux through the use of Method 115, since we are proposing to eliminate this requirement. For nonconventional impoundments we estimate that the additional costs incurred by this proposed rule will be to maintain one meter of liquid in each nonconventional impoundment, and we have estimated those costs between approximately $1,040 and $9,680 per year. For heap leach piles, additional costs incurred by this proposed rule would be for the maintaining and monitoring of the continuous 30% moisture content requirement, which we estimate will impose a one-time cost of approximately $35,000 for equipment and approximately $86,000 per year to monitor the moisture content.

C. What are the non-air environmental impacts?

Water quality would be maintained by implementation of this proposed rule. This proposed rule does contain requirements (by reference) related to water discharges and spill containment. In fact, the liner requirements cross referenced at 40 CFR 192.32(a)(1) will significantly decrease the possibility of contaminated liquids leaking from impoundments into ground water (which can be a significant source of drinking water). Section 192.32(a)(1) includes a cross-reference to the surface impoundment design and construction requirements of hazardous waste surface impoundments regulated under the Resource Conservation and Recovery Act (RCRA), found at 40 CFR 264.221. Those requirements state that the impoundment shall be designed, constructed and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil or ground water or surface water at any time during the active life of the impoundment. There are other requirements for the design and operation of the impoundment, and these include construction specifications, slope requirements, sump and liquid removal requirements.

These liner systems (conventional, nonconventional and heap leach piles)are already required by 40 CFR 192.32(a)(1), which, as explained above, are requirements promulgated by EPA under UMTRCA that are incorporated into NRC regulations and implemented and enforced by NRC through their licensing requirements. Therefore, we are not placing any additional liner requirements on facilities or requiring them to incur any additional costs to build their conventional or nonconventional impoundments or heap leach piles above and beyond what an owner or operator of these impoundments must already incur to obtain an NRC license.

Including a double liner in the design of all onsite impoundments that would contain uranium byproduct material would reduce the potential for ground-water contamination. Although the amount of the potential reduction is not quantifiable, it is important to take this into consideration due to the significant use of ground water as a source of drinking water.

VII. Statutory and Executive Orders Review

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), this action is a "significant regulatory action." The Executive Order defines "significant regulatory action" as one that is likely to result in a rule that may "raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order." Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under Executive Orders 12866 and 13563 (76 FR 3821, January 21, 2011) and any changes made in response to OMB recommendations have been documented in the docket for this action.

B. Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR number 2464.01.

The information to be collected for the proposed rulemaking today is based on the requirements of the Clean Air Act. Section 114 authorizes the Administrator of EPA to require any person who owns or operates any emission source or who is subject to any requirements of the Act to:

- Establish and maintain records
- Make reports, install, use, and maintain monitoring equipment or method
- Sample emissions in accordance with EPA-prescribed locations, intervals and methods
- Provide information as may be requested

EPA’s regional offices use the information collected to ensure that public health continues to be protected from the hazards of radionuclides by compliance with health based standards and/or Generally Available Control Technology (GACT).

The proposed rule would require the owner or operator of a uranium recovery facility to maintain records that confirm that the conventional impoundment(s), nonconventional impoundment(s) and heap leach pile(s) meet the requirements in section 192.32(a)(1). Included in these records are the results of liner compatibility tests, measurements confirming that one meter of liquid has been maintained in nonconventional impoundments and records confirming that heap leach piles have constantly maintained at least 30% moisture content during the operating life of the heap leach pile. This documentation should be sufficient to allow an independent auditor (such as an EPA inspector) to verify the accuracy of the determination made concerning the facility's compliance with the standard. These records must be kept at the mill or facility for the operational life of the facility and, upon request, be made available for inspection by the Administrator, or his/her authorized representative. The proposed rule would not require the owners or operators of operating impoundments and heap leach piles to report the results of the compliance inspections or calculations required in Section 61.255. The recordkeeping requirements require only the specific information needed to determine compliance. We have taken this step to minimize the reporting requirements for small business facilities.

The annual proposed monitoring and recordkeeping burden to affected sources for this collection (averaged over the first three years after the effective date of the proposed rule) is estimated to be 10,400 hours with a total annual cost of $400,000. This estimate includes a total capital and start-up cost component annualized over the facility’s expected useful life, a total operation and maintenance component, and a purchase of services component. We estimate that this total burden will be spread over 21 facilities that will be required to keep records. Of this total burden, however, 4,150 hours (and $93,000) will be incurred by the one heap leach uranium recovery facility, due to the requirements for purchasing, installing and monitoring the soil moisture sensors, as well as training staff on how to operate the equipment.

Burden is defined at 5 CFR 1320.3(b). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

To comment on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, EPA has established a public docket for this rule, which includes this ICR, under Docket ID number EPA-HQ-OAR-2008-0218. Submit any comments related to the ICR to EPA and OMB. See ADDRESSES section at the beginning of this notice for where to submit comments to EPA. Send comments on the ICR to OMB to the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW, Washington, DC 20503, Attention: Desk Office for EPA. Since OMB is required to make a decision concerning the ICR between 30 and 60 days after **[Insert date of publication in the Federal Register.]**, a comment to OMB is best assured of having its full effect if OMB receives it by **[Insert date**

30 days after publication in the Federal Register.]. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of today's rule on small entities, small entity is defined as: (1) a small business whose company has less than 500 employees and is primarily engaged in leaching or beneficiation of uranium, radium or vanadium ores as defined by NAIC code 212291; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this proposed rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. This proposed rule is estimated to impact approximately 18 uranium recovery facilities that are currently operating or plan to operate in the future.

To evaluate the significance of the economic impacts of the proposed revisions to Subpart W, separate analyses were performed for each of the three proposed GACTs.

The GACT for uranium recovery facilities that use conventional milling techniques proposes that only phased disposal units or continuous disposal units be used to manage the tailings. For either option, the disposal unit must be lined and equipped with a leak detection system, designed in accordance with part 192.32(a)(1). If phased disposal is the option chosen, the rule limits the disposal unit to a maximum of 40 acres, with no more than two units open at any given time. If continuous disposal is chosen, no more than 10 acres may be open at any given time. Finally, the Agency is proposing to eliminate the distinction that was made in the 1989 rule between impoundments constructed pre-1989 and post-1989 since all of the remaining pre-1989 impoundments comply with the proposed GACT. The elimination of this distinction also eliminates the requirement that pre-1989 disposal units be monitored on an annual basis to demonstrate that the average Rn-222 flux does not exceed 20 pCi/m^2/sec.

The conventional milling GACT applies to three existing mills and one proposed mill that is in the process of being licensed. The four conventional mills are: the White Mesa mill owned by Energy Fuels Resources (USA); the Shootaring Canyon mill owned by Uranium One, Inc.; the Sweetwater mill owned by Kennecott Uranium Co.; and the proposed Piñon Ridge mill owned by Energy Fuels, Inc. Of the three companies that own conventional mills, none are classified as small businesses using fewer than 500 employees as the classification criterion.

Energy Fuels White Mesa mill uses a phased disposal system that complies with the proposed GACT. When its existing open unit is full it will be contoured and covered and a new unit, constructed in accordance with the proposed GACT, will be opened to accept future tailings. Energy Fuels is proposing a phased disposal system to manage its tailings; this system also complies with the proposed GACT.

Based on the fact that both small entities are in compliance with the proposed GACT, we conclude that the rulemaking will not impose any new economic impacts on either facility. For Energy Fuels Mines, the proposed rule will actually result in a cost saving as it will no longer have to perform annual monitoring to determine the average radon flux from its impoundments.

The GACT for evaporation ponds at uranium recovery facilities requires that the evaporation ponds be constructed in accordance with design requirements in part 192.32(a)(1) and that a minimum of 1 meter of liquid be maintained in the ponds during operation and standby. The key design requirements for the ponds are for a double-liner with a leak detection system between the two liners.

In addition to the four conventional mills identified above, the GACT for evaporation ponds applies to in-situ leach facilities and heap leach facilities. Currently, there are five operating ISL facilities and no operating heap leach facilities. The operating ISLs are Crow Butte and Smith Ranch owned by Cameco Resources, Alta Mesa owned by Mestena Uranium, LLC, Willow Creek owned by Uranium One, Inc., and Hobson owned by Uranium Energy Corp. Again using the fewer than 500 employees' criterion, Mestena Uranium, LLC and Uranium Energy Corp are both small businesses, while Cameco Resources and Uranium One, Inc. are both large businesses.

All of the evaporation ponds at the four conventional mills and the five ISL facilities were built in conformance with part 192.32(a)(1). Therefore, the only economic impact is the cost of complying with the new requirement to maintain a minimum of 1 meter of water in the ponds during operation and standby.

The proposed revisions to Subpart W apply to five currently operating ISL facilities. The operating facilities are Crow Butte (Nebraska) and Smith Ranch (Wyoming), owned by Cameco Resources; Alta Mesa (Texas), owned by Mestena Uranium, LLC; Willow Creek (Wyoming), owned by Uranium One, Inc.; and Hobson (Texas), owned by Uranium Energy Corp. Again using the fewer than 500 employees' criterion, Mestena Uranium, LLC and Uranium Energy Corp are both small businesses, while Cameco Resources and Uranium One, Inc. are both large businesses.

In addition to the five operating ISL facilities, three additional ISL facilities have been licensed, all in the state of Wyoming. These are: Lost Creek, owned by Ur-Energy Inc.; Moore Ranch, owned by Uranium One, Inc.; and Nichols Ranch, owned by Uranerz Uranium Corp. Of these three companies, both Ur-Energy Inc. and Uranerz Uranium Corp. are small businesses.

Eleven other ISL facilities have been proposed for licensing. These include: Dewey-Burdock (South Dakota) and Centennial (Colorado), both owned by Powertech Uranium Corp.; and Kingsville Dome, Los Finados, Rosito, and Vasques (Texas), all owned by Uranium Resources Inc.; Crownpoint (New Mexico), also owned by Uranium Resources Inc., Church Rock (New Mexico), owned by Strathmore Minerals; Ross (Wyoming), owned by Strata Energy, Inc., Goliad (Texas), owned by Uranium Energy Corp.; and Antelope-Jab (Wyoming), owned by Uranium One, Inc. All of these companies, except for Uranium One, Inc. are small businesses.

According to the licensing documents submitted by the owners of the proposed ISL facilities, all will be constructed in conformance with part 192.32(a)(1). Therefore the only economic impact is the cost of complying with the new requirement to maintain a minimum of 1 meter of water in the ponds during operation and standby.

The requirement to maintain a minimum of 1 meter of liquid in the ponds is estimated to cost up to $0.03 per pound of U_3O_8 produced. This cost is not a significant impact on any of these small entities.

Although there are no heap leach facilities currently licensed, Energy Fuels, Inc. is expected to submit a licensing application for the Sheep Mountain Project. From the preliminary documentation that Titan presented (now owned by Energy Fuels), the facility will have an Evaporation Pond, a Collection Pond, and a Raffinate Pond. All three ponds will be double lined with leak detection. However, as Energy Fuels is a large business, it does not affect the determination of impacts on small businesses.

The GACT for heap leach facilities applies the phased disposal option of the GACT for conventional mills to these facilities and adds the requirement that the heap leach pile be maintained at a minimum 30 percent moisture content by weight during operations.

As noted previously, there are no heap leach facilities currently in existence, and the only one that is known to be preparing to submit a license application is being proposed by Energy Fuels, which is a large business.

Of the 20 facilities identified above, 15 are owned by small businesses. No small organizations or small governmental entities have been identified that would be impacted by the proposed GACTs. We continue to be interested in the potential impacts of the proposed rule on small entities and welcome comments on issues related to such impacts.

D. Unfunded Mandates Reform Act

This rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local and tribal governments, in the aggregate, or the private sector in any one year. The proposed rule imposes no enforceable duties on any State, local or Tribal governments or the private sector. Thus, this rule is not subject to the requirements of sections 202 or 205 of UMRA.

This rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments because it contains no requirements that apply to such governments nor does it impose obligations upon them.

E. Executive Order 13132: Federalism

This proposed rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. None of the facilities subject to this action are owned and operated by State governments, and, nothing in the proposed rule will supersede State regulations. Thus, Executive Order 13132 does not apply to this proposed rule.

In the spirit of Executive Order 13132 and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicits comment on this proposed rule from State and local officials.

F. Executive Order 13175: Consultation and Coordination with Indian Tribal Governments

This action does not have tribal implications, as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). The action imposes requirements on owners and operators of specified area sources and not tribal governments. Thus, Executive Order 13175 does not apply to this action.

EPA specifically solicits additional comment on this proposed action from tribal officials.

G. Executive Order 13045: Protection of Children from Environmental Health Risks and Safety Risks

EPA interprets EO 13045 (62 FR 19885, April 23, 1997) as applying to those regulatory actions that concern health or safety risks, such that the analysis required under section 5-501 of the Order has the potential to influence the regulation. This action is not subject to EO 13045 because it is based solely on technology performance.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" as defined in Executive Order 13211 (66 FR 28355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This proposed rule will not adversely directly affect productivity, competition, or prices in the energy sector.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law No. 104-113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This proposed rulemaking does not involve technical standards. Therefore, EPA is not considering the use of any voluntary consensus standards.

We request public comment on this aspect of the proposed rulemaking, and specifically, ask you to identify potentially applicable voluntary consensus standards and to explain why such standards could be used in this regulation.

J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this proposed rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population. This proposed rule would reduce toxics emissions of radon from nonconventional impoundments and heap leach piles and thus decrease the amount of such emissions to which all affected populations are exposed.

List of Subjects in 40 CFR Part 61

Environmental protection, Air pollution control, Hazardous substances, Radon, Tailings, Byproduct, Uranium, Reporting and recordkeeping requirements.

____

Dated:

____

Gina McCarthy,
Administrator.

For the reasons stated in the preamble, the Environmental Protection Agency proposes to amend title 40, Chapter I of the Code of Federal Regulations as follows:

PART 61—-[National Emission Standards for Hazardous Air Pollutants]

1. The authority citation for part 61 continues to read as follows:

Authority: 42 U.S.C. 7401 et seq.

Subpart W—[National Emission Standards for Radon Emissions From Operating Mill Tailings]

2. Section 61.251 is amended by revising definition e and adding new definitions h-m as follows:

§61.251 Definitions

*   *   *   *   *

(e) Operation. Operation means that an impoundment is being used for the continued placement of uranium byproduct materials or tailings or is in standby status for such placement. An impoundment is in operation from the day that uranium byproduct materials or tailings are first placed in the impoundment until the day that final closure begins.

(h) Conventional Impoundment. A conventional impoundment is a permanent structure located at any uranium recovery facility which contains mostly solid uranium byproduct material from the extraction of uranium from uranium ore. These impoundments are left in place at facility closure.

(i) Non-Conventional Impoundment. A non-conventional impoundment can be located at any uranium recovery facility and contains uranium byproduct material suspended in and/or covered by liquids. These structures are commonly known as holding ponds or evaporation ponds. They are removed at facility closure.

(j) Heap Leach Pile. A heap leach pile is a pile of uranium ore placed on an engineered structure and stacked so as to allow uranium to be dissolved and removed by leaching liquids.

(k) Standby. Standby means the period of time that an impoundment may not be accepting uranium byproduct materials but has not yet entered the closure period.

(l) Uranium Recovery Facility. A uranium recovery facility means a facility licensed by the NRC or an NRC Agreement State to manage uranium byproduct materials during and following the processing of uranium ores. Common names for these facilities are a conventional uranium mill, an in-situ leach (or recovery) facility and a heap leach facility or pile.

(m) Heap Leach Pile Operational Life. The operational life of a heap leach pile means the time that lixiviant is first placed on the heap leach pile until the time of the final rinse.

3. Section 61.252 is revised to read as follows:

§61.252 Standard.

(a) Conventional Impoundments.

(1) Conventional impoundments shall be designed, constructed and operated to meet one of the two following management practices:

(i) Phased disposal in lined tailings impoundments that are no more than 40 acres in area and shall comply with the requirements of 40 CFR 192.32(a)(1). The owner or operator shall have no more than two conventional impoundments, including existing impoundments, in operation at any one time.

(ii) Continuous disposal of tailings such that tailings are dewatered and immediately disposed with no more than 10 acres uncovered at any time and shall comply with the requirements of 40 CFR 192.32(a)(1).

(b) Non-Conventional Impoundments. Non-conventional impoundments shall meet the requirements of 40 CFR 192.32(a)(1). During operation and until final closure begins, the liquid level in the impoundment shall not be less than one meter.

(c) Heap Leach Piles. Heap leach piles shall comply with the phased disposal management practice in 40 CFR 61.252(a)(1)(i). Heap leach piles shall be constructed in lined impoundments that are no more than 40 acres in area and shall comply with the requirements of 40 CFR 192.32(a)(1). The owner or operator shall have no more than two heap leach piles, including existing heap leach piles, in operation at any one time. The moisture content of heap leach piles shall be maintained at 30% or greater. The moisture content shall be determined on a daily basis, and performed using generally accepted geotechnical methods. The moisture content requirement shall apply during the heap leach pile operational life.

§61.253 [Removed]

4. Section 61.253 is removed.

§61.254 [Removed]

5. Section 61.254 is removed.

6. Section 61.255 is revised to read as follows:

§61.255 Recordkeeping requirements

(a) The owner or operator of any uranium recovery facility must maintain records that confirm that the conventional impoundment(s), nonconventional impoundment(s) and heap leach pile(s) at the facility meet the requirements in 40

CFR 192.32(a)(1). These records shall include, but not be limited to, the results of liner compatibility tests.

(b) The owner or operator of any uranium recovery facility with nonconventional impoundments must maintain records that include measurements confirming that one meter of liquid has been maintained in the nonconventional impoundments at the facility.

(c) The owner or operator of any heap leach facility shall maintain records confirming that the heap leach piles maintained at least 30% moisture content by weight during the heap leach pile operational life.

(d) The records required in paragraphs (a), (b) and (c) above must be kept at the uranium recovery facility for the operational life of the facility and must be made available for inspection by the Administrator, or his authorized representative.